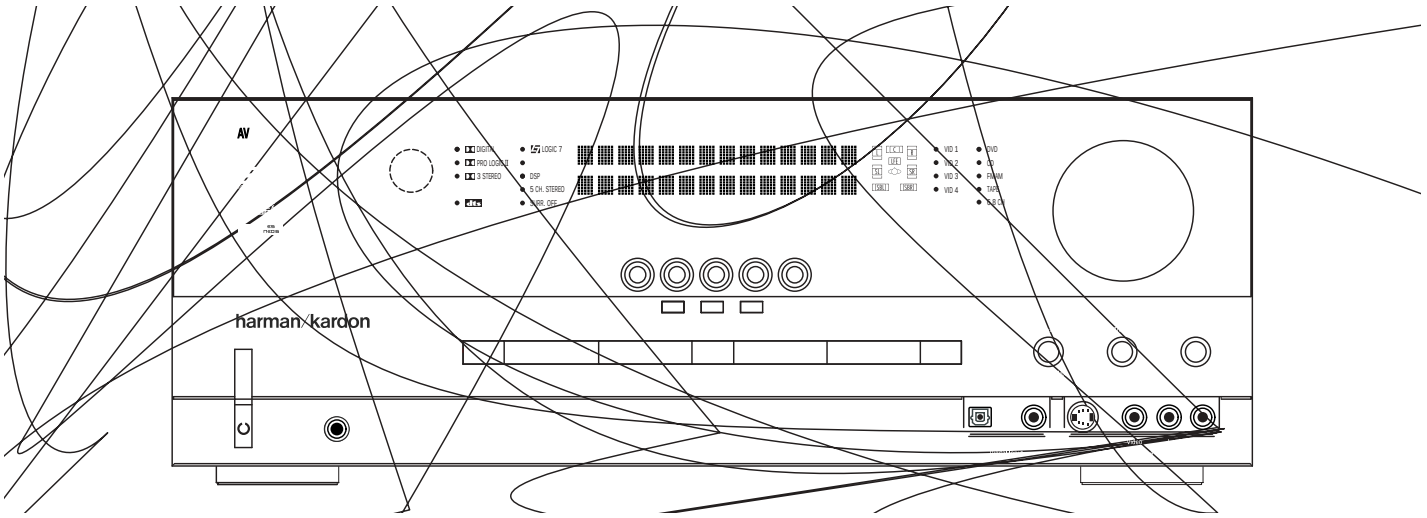

AV
DIGITAL
PRO LOGIC II
3 STEREO
dts
LOGIC 7
DSP
5 CH. STEREO
NR OFF
VID 1
VID 2
VID 3
VID 4
DVD
CD
FM/AM
TAPE
harman/kardon

3 Introduction
4 Important Safety Information
4 Unpacking
5 Front-Panel Controls
7 Rear-Panel Connections
10 Main Remote Control Functions
13 Installation and Connections
15 System Configuration
15 Speaker Placement
15 System Setup
17 Input Setup
17 Surround Setup
18 Speaker Setup
20 Delay Settings
21 Output Level Adjustment
21 Using EzSet
22 Manual Output Level Adjustment
24 Operation
24 Basic Operation
24 Source Selection
24 6-Channel/8-Channel Direct Input
24 Volume Control
24 Surround Mode Selection
25 Digital Audio Playback
26 Surround Mode Chart
28 Tuner Operation
29 Tape Recording
29 Output Level Trim Adjustment
30 Advanced Features
30 Display Brightness
30 Turn-On Volume Level
30 Semi-OSD Settings
31 Full-OSD Time-Out Adjustment
32 Programming the Remote
32 Programming the Remote
32 Direct Code Entry
32 Auto Search Method
32 Code Readout
32 Macro Programming
33 Programmed Device Functions
34 Volume Punch-Through
34 Channel Control Punch-Through
34 Transport Control Punch-Through
35 Resetting the Remote Memory
36 Function List
38 Setup Code Tables
48 Troubleshooting Guide
48 Processor Reset
49 Technical Specifications
49 Trademark Acknowledgements

Typographical Conventions

In order to help you use this manual with the remote control, front-panel controls and rear-panel connections, certain conventions have been used.

EXAMPLE – (bold type) indicates a specific remote control or front-panel button, or rear-panel connection jack

EXAMPLE – (OCR type) indicates a message that is visible on-screen or on the front-panel information display

1 – (number in a square) indicates a specific front-panel control

1 – (number in a circle) indicates a rear-panel connection

1 – (number in an oval) indicates a button or indicator on the remote

Thank you for choosing Harman Kardon®! With the purchase of a Harman Kardon AVR 230 you are about to begin many years of listening enjoyment. Designed to provide all the excitement and detail of movie soundtracks and every nuance of musical selections, the AVR 230 is truly a multichannel receiver for the new millennium.

The AVR 230 has been engineered so that it is easy to take advantage of all the power of its digital technology. However, to obtain the maximum enjoyment from your new receiver, we urge you to read this manual. A few minutes spent learning the functions of the various controls will enable you to take advantage of all the power the AVR 230 is able to deliver.

If you have any questions about this product, its installation or its operation, please contact your retailer or custom installer. They are your best local sources of information.

Description and Features

The AVR 230 is versatile and multifeatured, incorporating a wide range of listening options. In addition to Dolby* Digital and DTS® decoding for digital sources, a broad choice of Matrix surround-encoded or Stereo surround modes are available for use with sources such as CD, VCR, TV broadcasts and the AVR 230's own FM/AM tuner. Along with Dolby Digital EX, Dolby Pro Logic* II, DTS Neo:6®, Dolby 3 Stereo, and Hall and Theater modes, the AVR 230 offers Harman International's exclusive Logic 7® process in both 5.1 and 7.1 versions to create a wider, more enveloping field environment and more defined fly-overs and pans. Another exclusive is VMAx®, which uses proprietary processing to create an open, spacious sound field even when only two front speakers are available.

In addition to providing a wide range of listening options, the AVR 230 is easy to configure so that it provides the best results with your speakers and specific listening-room environment. On-screen menus make it simple to enter settings for speaker configurations and bass management, and the EzSet remote measures a system's sound levels and automatically calibrates them for perfectly balanced sound field presentation.

For the ultimate in flexibility, the AVR 230 features connections for five video devices, all with both composite and S-Video inputs. Two additional audio inputs are available, and six digital inputs make the AVR 230 capable of handling all the latest digital audio sources. For compatibility with the latest HDTV video sources and progressive scan DVD players, the AVR 230 also features two-input, wide-bandwidth, low-crosstalk component video switching.

The front panel offers coax and optical digital inputs for direct connection to digital recorders. Two video recording outputs, preamp-out and a color-coded eight-channel input, with complete digital bass management, make the AVR 230 virtually future-proof, with everything needed to accommodate tomorrow's new formats right onboard.

The AVR 230's powerful amplifier uses traditional Harman Kardon high-current design technologies to meet the wide dynamic range of any program selection.

Harman Kardon invented the high-fidelity receiver fifty years ago. With state-of-the-art circuitry and time-honored circuit designs, the AVR 230 is the perfect combination of the latest in digital audio technology, a quiet yet powerful analog amplifier in an elegant, easy-to-use package.

For Canadian model

This class B digital apparatus complies with Canadian ICES-003.
For models having a power cord with a polarized plug:
CAUTION: To prevent electric shock, match wide blade of plug to wide slot, fully insert.

Modèle pour les Canadien

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
Sur les modèles dont la fiche est polarisee:
ATTENTION: Pour éviter les chocs électriques, introduire la lame la plus large de la fiche dans la borne correspondante de la prise et pousser jusqu'au fond.

- A wide range of digital and matrix surround modes, including Dolby® Digital, Dolby Digital EX, Dolby Pro Logic® II, DTS®, DTS-ES® Discrete and Matrix and DTS Neo:6®
- Six channels of high-current amplification
- Harman Kardon's exclusive Logic 7® processing, available for the first time with both 7.1 and 5.1 processing in a variety of modes, and two modes of VMAx®
- EzSet™ remote automatically sets output levels for optimum performance
- High-bandwidth, HDTV-compatible component video switching
- Discrete front-panel coaxial and optical digital inputs for easy connection to portable digital devices and video game consoles
- Extensive bass management options, including three separate crossover groupings
- On-screen menu and display system

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION: To prevent electric shock, do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Important Safety Information

Verify Line Voltage Before Use

Your AVR 230 has been designed for use with 120-volt AC current. Connection to a line voltage other than that for which it is intended can create a safety and fire hazard and may damage the unit.

If you have any questions about the voltage requirements for your specific model, or about the line voltage in your area, contact your selling dealer before plugging the unit into a wall outlet.

Do Not Use Extension Cords

To avoid safety hazards, use only the power cord attached to your unit. We do not recommend that extension cords be used with this product. As with all electrical devices, do not run power cords under rugs or carpets or place heavy objects on them. Damaged power cords should be replaced immediately by an authorized service center with a cord meeting factory specifications.

Handle the AC Power Cord Gently

When disconnecting the power cord from an AC outlet, always pull the plug; never pull the cord. If you do not intend to use the unit for any considerable length of time, disconnect the plug from the AC outlet.

Do Not Open the Cabinet

There are no user-serviceable components inside this product. Opening the cabinet may present a shock hazard, and any modification to the product will void your guarantee. If water or any metal object such as a paper clip, wire or a staple accidentally falls inside the unit, disconnect it from the AC power source immediately, and consult an authorized service center.

CATV or Antenna Grounding

If an outside antenna or cable system is connected to this product, be certain that it is grounded so as to provide some protection against voltage surges and static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes and requirements of the grounding electrode.

NOTE TO CATV SYSTEM INSTALLER: This reminder is provided to call the CATV (Cable TV) system installer's attention to article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as possible.

Installation Location

- To ensure proper operation and to avoid the potential for safety hazards, place the unit on a firm and level surface. When placing the unit on a shelf, be certain that the shelf and any mounting hardware can support the weight of the product.
- Make certain that proper space is provided both above and below the unit for ventilation. If this product will be installed in a cabinet or other enclosed area, make certain that there is sufficient air movement within the cabinet. Under some circumstances a fan may be required.
- Do not place the unit directly on a carpeted surface.
- Avoid installation in extremely hot or cold locations, or in an area that is exposed to direct sunlight or heating equipment.
- Avoid moist or humid locations.
- Do not obstruct the ventilation slots on the top of the unit, or place objects directly over them.
- Due to the weight of the AVR 230 and the heat generated by the amplifiers, there is the remote possibility that the rubber padding on the bottom of the unit's feet may leave marks on certain wood or veneer materials. Use caution when placing the unit on soft woods or other materials that may be damaged by heat or heavy objects.

Cleaning

When the unit gets dirty, wipe it with a clean, soft, dry cloth. If necessary, wipe it with a soft cloth dampened with mild soapy water, then a fresh cloth with clean water. Wipe dry immediately with a dry cloth. NEVER use benzene, aerosol cleaners, thinner, alcohol or any other volatile cleaning agent. Do not use abrasive cleaners, as they may damage the finish of metal parts. Avoid spraying insecticide near the unit.

Moving the Unit

Before moving the unit, be certain to disconnect any interconnection cords with other components, and make certain that you disconnect the unit from the AC outlet.

Important Information for the User

This equipment has been tested and found to comply with the limits for a Class-B digital device, pursuant to Part 15 of the FCC Rules. The limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio-frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that harmful interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept interference received, including interference that may cause undesired operation.

NOTE: Changes or modifications may cause this unit to fail to comply with Part 15 of the FCC Rules and may void the user's authority to operate the equipment.

Unpacking

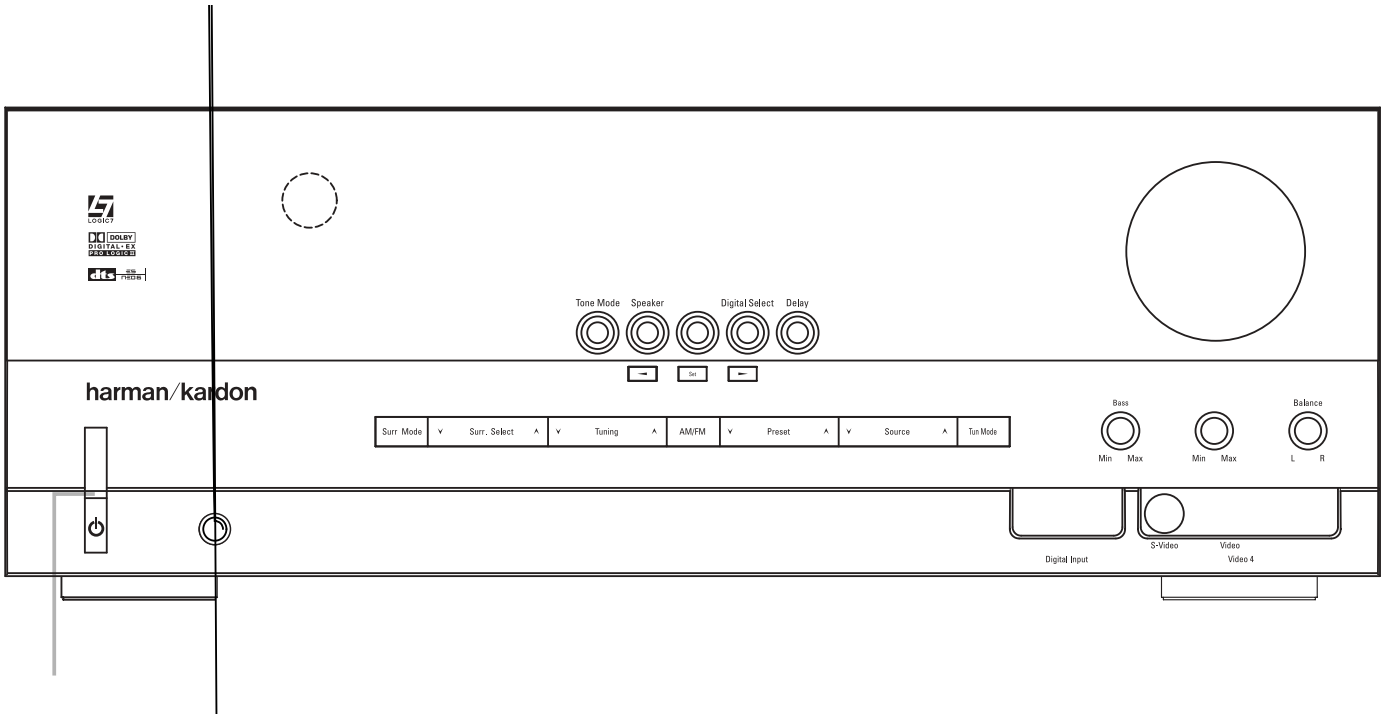
The carton and shipping materials used to protect your new receiver during shipment were specially designed to cushion it from shock and vibration. We suggest that you save the carton and packing materials for use in shipping if you move, or should the unit ever need repair.

To minimize the size of the carton in storage, you may wish to flatten it. This is done by carefully slitting the tape seams on the bottom and collapsing the carton. Other cardboard inserts may be stored in the same manner. Packing materials that cannot be collapsed should be saved along with the carton in a plastic bag.

If you do not wish to save the packaging materials, please note that the carton and other sections of the shipping protection are recyclable. Please respect the environment and discard those materials at a local recycling center.

it is important that you remove the protective plastic film from the front-panel lens. Leaving the film in place will affect the performance of your remote control.

FRONT-PANEL CONTROLS



1 Main Power Switch
2 Power Indicator
3 Standby/On Switch
4 Headphone Jack
5 Tone Mode
6 Speaker Selector
7 Surround Mode Group Selector
8 Surround Mode Selector
9 Tuning Selector
10 ◀/▶ Buttons
11 Tuner Band Selector
12 Set Button
13 Digital Input Selector
14 Preset Station Selector
15 Delay Adjust Selector
16 Input Source Selector
17 Tuner Mode Selector
18 Optical 3 Digital Input
19 Coaxial 3 Digital Input
20 Video 4 Video Input Jacks
21 Video 4 Audio Input Jacks
22 Bass Control
23 Balance Control
24 Treble Control
25 Channel Adjust Selector
26 Volume Control
27 Input Indicators
28 Speaker/Channel Input Indicators
29 Upper Display Line
30 Lower Display Line
31 Surround Mode Indicators
32 Remote Sensor Window

1 Main Power Switch: Press this button to apply power to the AVR 230. When the switch is pressed in, the unit is in a Standby mode, as indicated by the amber LED **2** above the Standby/On Switch **3**. This button MUST be pressed in to operate the unit. To turn the unit off and prevent the use of the remote control, this switch should be pressed until it pops out from the front panel and the word "OFF" is seen at the top of the switch.

NOTE: This switch is normally left in the "ON" position.

2 Power Indicator: This LED lights amber when the unit is in the Standby mode to signal that the AVR is ready to be turned on. When the unit is in operation, the indicator is blue.

3 Standby/On Switch: When the Main Power Switch **1** is "ON," press this button to turn on the AVR 230; press it again to turn the unit off. The Power Indicator **3** turns blue when the unit is on.

4 Headphone Jack: This jack may be used to listen to the AVR 230's output through a pair of headphones. The speakers will automatically be turned off when the headphone jack is in use.

5 Tone Mode: Pressing this button enables or disables the Bass and Treble tone controls. When the button is pressed so that *TONE IN* appears in the Lower Display Line **30**, the Bass **22** and Treble **24** controls may be used to adjust the output signals. When the button is pressed once or twice so that the words *TONE OUT* appear in the Lower Display Line **30**, the output signal will be "flat," no matter how the actual Bass and Treble Controls **22** **24** are adjusted.

6 Speaker Selector: Press this button to begin the process of configuring the unit to match the type of speakers used in your listening room. (See pages 18–20 for more information on speaker setup and configuration.)

7 Surround Mode Group Selector: Press this button to select the top-level group of surround modes. Each press of the button will select the current or last used mode in each of the surround mode groups (e.g., Dolby, DTS, DTS Neo:6, Logic 7, DSP, Stereo). When the button is pressed so that the name of the surround mode group appears in the on-screen display and in the Lower Display Line **30**, press the Surround Mode Selector **8** to cycle through the individual modes available. For example, press this button to select Dolby modes, and then press the Surround Mode Selector **8** to choose from the various mode options.

8 Surround Mode Selector: Press this button to select from among the available surround mode options for the mode group selected. The specific modes will vary based on the number of speakers available, the mode group and if the input source is digital or analog. For example, press the Surround Mode Group Selector **7** to select a main mode grouping such as Dolby or Logic 7, and then press this button to see the specific mode choices available. For more information on mode selection, see page 26.

9 Tuning Selector: Press the left side of the button to tune lower-frequency stations and the right side of the button to tune higher-frequency stations. When the tuner is in the Manual mode, each tap will increase or decrease the frequency by one increment. When the tuner receives a strong enough signal for adequate reception, *MANUAL TUNED* will appear in the on-screen display and the Lower Display Line **30**. When the tuner is the Auto mode, press the button once, and the tuner will scan for a station with acceptable signal strength. When the next station with a strong signal is tuned the scan will stop and the on-screen display and Lower Display Line **30** will indicate *AUTO TUNED*. When an FM Stereo station is tuned, the display will read *AUTO ST TUNED*.

To switch back and forth between the Auto and Manual tuning modes, press the Tuner Mode Selector **17**.

10 ◀/▶ Buttons: When configuring the AVR 230's settings, use these buttons to select from the available choices.

11 Tuner Band Selector: Press this button to turn the AVR on and to select the Tuner as the input. Press it again to switch between the AM and FM frequency bands. (See page 28 for more information on the tuner.)

12 Set Button: When making choices during the setup and configuration process, press this button to enter the desired setting into the AVR 230's memory.

13 Digital Input Selector: Press this button to select one of the digital inputs or the analog input for any source. (See pages 25–28 for more information on digital audio.)

14 Preset Stations Selector: Press this button to scroll up or down through the list of stations that have been entered into the preset memory. (See page 28 for more information on tuner presets.)

15 Delay Adjust Selector: Press this button to begin the steps required to enter delay settings. (See page 20 for more information on delay times.)

16 Input Source Selector: Press this button to change the input by scrolling up or down through the list of Input Indicators **27**.

17 Tuner Mode Selector: Press this button to select Auto or Manual tuning. When the button is pressed so that the *AUTO* appears in the Lower Display Line **30**, the tuner will search for the next station with an acceptable signal when the Tuning Selector **9** **21** is pressed. When the button is pressed so that *MANUAL* appears in the Lower Display Line **30**, each press of the Tuning Selector **9** **21** will increase the frequency. This button may also be used to switch between Stereo and Mono modes for FM radio reception. When weak reception is encountered, press the button so that *MANUAL* appears in the Lower Display Line **30** and on the on-screen display to switch to Mono reception. Press it again to switch back to Stereo mode. (See page 28 for more information on using the tuner.)

18 Optical 3 Digital Input: Connect the optical digital audio output of an audio or video product to this jack. When the input is not in use, be certain to keep the plastic cap installed to avoid dust contamination that might degrade future performance.

19 Coaxial 3 Digital Input: This jack is used for connection to the output of portable audio devices, video game consoles or other products that have a coax digital audio jack.

20 Video 4 Video Input Jacks: These jacks may be used for temporary connection to the composite or S-Video output of video games, camcorders or other portable video products. You may make a connection to either jack at any time, but not to both simultaneously.

21 Video 4 Audio Input Jacks: These audio jacks may be used for temporary connection to video games or portable audio/video products such as camcorders and portable audio players.

22 Bass Control: Turn this control to modify the low-frequency output of the left/right channels by as much as ±10dB.

23 Balance Control: Turn this control to change the relative volume for the front left/right channels.

NOTE: For proper operation of the surround modes this control should be at the midpoint or "12 o'clock" position.

24 Treble Control: Turn this control to modify the high frequency output of the left/right channels by as much as ±10dB.

25 Channel Adjust Selector: Press this button to begin the process of trimming the channel output levels using an external audio source. (For more information on output level trim adjustment, see page 29.)

26 Volume Control: Turn this knob clockwise to increase the volume, counterclockwise to decrease the volume. If the AVR 230 is muted, adjusting the Volume Control **26** **38** will automatically release the unit from the silenced condition.

27 Input Indicators: The current selected source will appear as one of these indicators. Note that when the unit is turned on, the entire list of available modes will light briefly, and then revert to normal operation with only the active mode indicator illuminated.

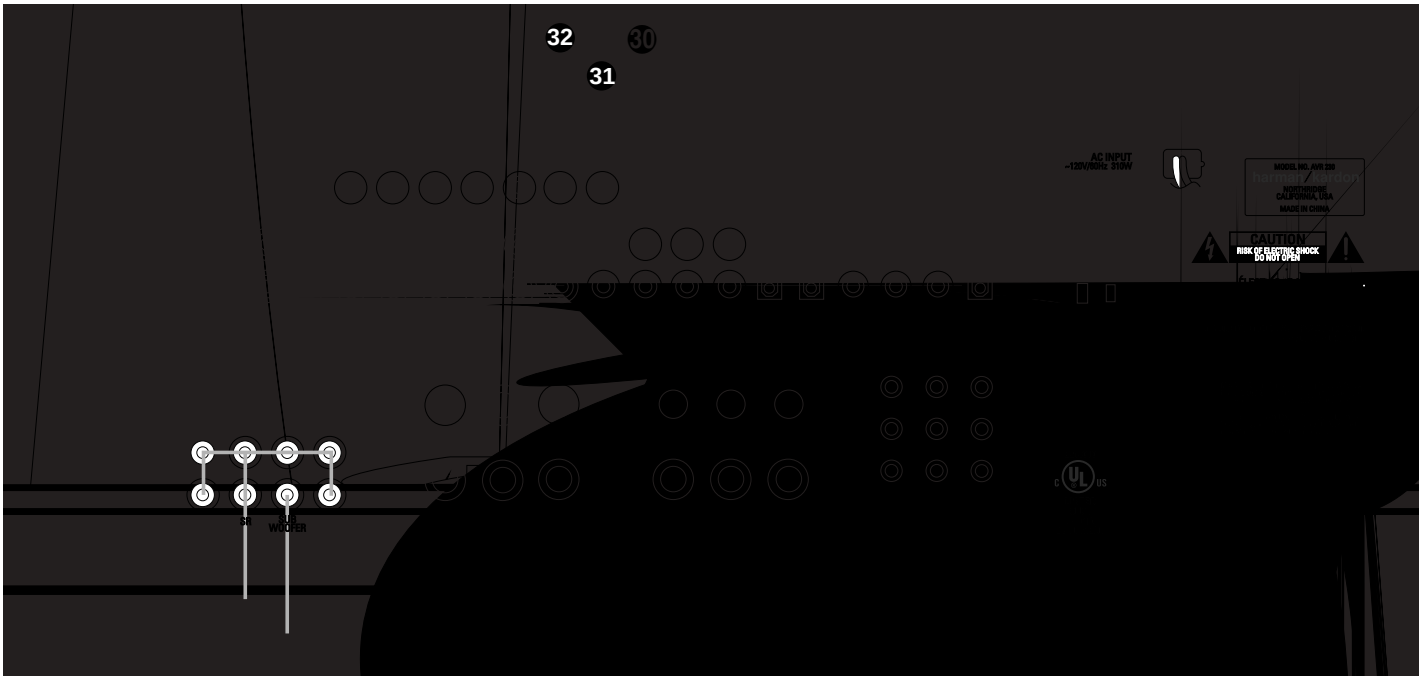
28 Speaker/Channel Input Indicators: These indicators are multipurpose, indicating both the speaker type selected for each channel and the incoming data-signal configuration. The left, center, right, right surround and left surround speaker indicators are composed of three boxes, while the subwoofer is a single box. The center box lights when a "small" speaker is selected, and the two outer boxes light when "large" speakers are selected. When none of the boxes are lit for the center, surround or subwoofer channels, no speaker has been assigned that position. (See page 18 for more information on configuring speakers.) The letters inside each box displays the active input channels. For standard analog inputs, only the L and R will light, indicating a stereo input. For a digital source, the indicators will light to display the channels being received at the digital input. When the letters flash, the digital input has been interrupted. (See page 27 for more information on the Channel Indicators.)

29 Upper Display Line: Depending on the unit's status, a variety of messages will appear here. In normal operation, this line will show current input source and which analog or digital input is in use. When the tuner is the input, this line will identify the station as AM or FM and show the frequency and preset number, if any.

30 Lower Display Line: Depending on the unit's status, a variety of messages will appear here. In normal operation, the current surround mode will show here.

31 Surround Mode Indicators: The current selected surround mode will appear as one of these indicators. Note that when the unit is turned on, the entire list of available modes will light briefly, and then revert to normal operation with only the active mode indicator illuminated.

32 Remote Sensor Window: The sensor behind this window receives infrared signals from the remote control. Aim the remote at this area and do not block or cover it.



NOTE: To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.

❶ FM Antenna Jack
❷ CD Audio Inputs
❸ Tape Outputs
❹ Tape Inputs
❺ Remote IR Input
❻ Remote IR Output
❼ Preamp Outputs
❽ Subwoofer Output
❾ Front Speaker Outputs
❿ Surround Back Speaker Outputs
⓫ Surround Speaker Outputs
⓬ Center Speaker Outputs
⓭ Video 2 Component Video Inputs
⓮ DVD Component Video Inputs
⓯ Component Video Monitor Outputs
⓰ AC Power Cord
⓱ Switched AC Accessory Outlet
⓲ Unswitched AC Accessory Outlet
⓳ Optical Digital Audio Output
⓴ Coaxial Digital Audio Output
㉑ S-Video Monitor Output
㉒ Coaxial Digital Audio Inputs
㉓ DVD S-Video Input
㉔ Video 1 S-Video Input
㉕ Optical Digital Audio Inputs
㉖ Video 1 S-Video Output
㉗ Video 2 S-Video Input
㉘ Video 2 S-Video Output
㉙ 6/8-Channel Direct Inputs
㉚ Video 3 S-Video Input
㉛ Video Monitor Output
㉜ DVD Audio/Video Inputs
㉝ Video 1 Audio/Video Inputs
㉞ Video 1 Audio/Video Outputs
㉟ Video 2 Audio/Video Inputs
㊱ Video 2 Audio/Video Outputs
㊲ Video 3 Audio/Video Inputs
㊳ AM Antenna Terminals

NOTE: To assist in making the correct connections for multichannel input, output and speaker connections, all connection jacks and terminals are color-coded in conformance with the CEA standards as follows:

Front Left:	White
Front Right:	Red
Center:	Green
Surround Left:	Blue
Surround Right:	Gray
Surround Back Left:	Brown
Surround Back Right:	Tan
Subwoofer:	Purple
Coaxial Digital Audio:	Orange
Composite Video:	Yellow
Component Video “Y”:	Green
Component Video “Pr”:	Red
Component Video “Pb”:	Blue

❶ FM Antenna Jack: Connect the supplied indoor (or an optional external) FM antenna to this terminal.

❷ CD Audio Inputs: Connect these jacks to the analog audio output of a compact disc player or CD changer.

❸ Tape Outputs: Connect these jacks to the RECORD/INPUT jacks of an audio recorder.

❹ Tape Inputs: Connect these jacks to the PLAY/OUT jacks of an audio recorder.

❺ Remote IR Input: If the AVR 230's front-panel IR sensor is blocked due to cabinet doors or other obstructions, an external IR sensor may be used. Connect the output of the sensor to this jack.

❻ Remote IR Output: This connection permits the IR sensor in the receiver to serve other remote controlled devices. Connect this jack to the “IR IN” jack on Harman Kardon (or other compatible) equipment.

❼ Preamp Outputs: Connect these jacks to an optional, external power amplifier for applications where higher power is desired.

REAR-PANEL CONNECTIONS

❽ Subwoofer Output: Connect this jack to the line-level input of a powered subwoofer. If an external subwoofer amplifier is used, connect this jack to the subwoofer amplifier input.

❾ Front Speaker Outputs: Connect these outputs to the matching + or – terminals on your left and right speakers. When making speaker connections always make certain to maintain correct polarity by connecting the color-coded (white for front left and red for front right) (+) terminals on the AVR 230 to the red (+) terminals on the speakers and the black (–) terminals on the AVR 230 to the black (–) terminals on the speakers. See page 13 for more information on speaker polarity.

❿ Surround Back Speaker Outputs: These speaker terminals are normally used to power the surround back speaker in a 6.1-channel system.

⓫ Surround Speaker Outputs: Connect these outputs to the matching + and – terminals on your surround channel speakers. In conformance with the CEA color-code specification, the blue terminal is the positive, or "+," terminal that should be connected to the red (+) terminal on the Surround Left speaker with older color-coding, while the gray terminal should be connected to the red (+) terminal on the Surround Right speaker with the older color-coding. Connect the black (–) terminal on the AVR to the matching black negative (–) terminals for each surround speaker. (See page 13 for more information on speaker polarity.)

❶ Center Speaker Outputs: Connect these outputs to the matching + and – terminals on your center channel speaker. In conformance with the CEA color-code specification, the green terminal is the positive, or "+," terminal that should be connected to the red (+) terminal on speakers with the older color-coding. Connect the black (–) terminal on the AVR to the black (–) terminal on your speaker. (See page 13 for more information on speaker polarity.)

⓭ Video 2 Component Video Inputs: Connect the Y/Pr/Pb component video outputs of an HDTV set-top converter, satellite receiver or other video source device with component video outputs to these jacks.

⓮ DVD Component Video Inputs: Connect the Y/Pr/Pb component video outputs of a DVD player to these jacks.

⓯ Component Video Monitor Outputs: Connect these outputs to the component video inputs of a video projector or monitor. When a source connected to one of the Component Video Inputs ⓭⓮ is selected, the signal will be sent to these jacks.

⓰ AC Power Cord: Connect the AC power cord to a non-switched AC wall outlet.

⓱ Switched AC Accessory Outlet: These outlets may be used to power any device you wish to have turned on when the AVR 230 is turned on.

⓲ Unswitched AC Accessory Outlet: This outlet may be used to power any AC device. The power will remain on at this outlet regardless of whether the AVR 230 is on or off.

NOTE: The total power consumption of all devices connected to the accessory outlets should not exceed 100 watts.

⓳ Optical Digital Audio Output: Connect this jack to the optical digital input connector on a CD-R/RW, MiniDisc or other digital recorder.

⓴ Coaxial Digital Audio Output: Connect this jack to the coaxial digital input of a CD-R/RW, MiniDisc or other digital recorder.

㉑ S-Video Monitor Output: If any of the input sources used in your system have S-Video connections to the AVR, connect this jack to the S-Video input on your television, projector or other video display.

㉒ Coaxial Digital Audio Inputs: Connect the coax digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be a Dolby Digital signal, DTS signal or a standard PCM digital source. Do not connect the RF digital output of an LD player to these jacks.

㉓ DVD S-Video Input: Connect the S-Video output of a DVD player or other video source to this jack.

㉔ Video 1 S-Video Input: If the product connected to the Video 1 Audio Inputs ㉝ has S-Video capability, connect this jack to the PLAY/OUT S-Video jack on that unit and then make certain that the S-Video Monitor Output ㉑ is connected as described above.

㉕ Optical Digital Audio Inputs: Connect the optical digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be a Dolby Digital signal, a DTS signal or a standard PCM digital source.

㉖ Video 1 S-Video Output: If the product connected to the Video 1 Audio/Video Outputs ㉞ has S-Video capability, connect this jack to the REC/IN S-Video jack on that unit.

㉗ Video 2 S-Video Input: If the product connected to the Video 2 Audio/Video Inputs ㉟ has S-Video capability, connect this jack to the PLAY/OUT S-Video jack on that unit and then make certain that the S-Video Monitor Output ㉑ is connected as described above.

㉘ Video 2 S-Video Output: If the product connected to the Video 2 Audio/Video Outputs ㊱ has S-Video capability, connect this jack to the REC/IN S-Video jack on that unit.

㉙ 6/8-Channel Direct Inputs: These jacks are used for connection to source devices such as DVD-Audio or SACD players with discrete analog outputs. Depending on the source device in use, all eight jacks may be used, though in many cases only connections to the front left/right, center, surround left/right and LFE (subwoofer input) jacks will be used for standard 5.1 audio signals.

㉚ Video 3 S-Video Input: If the product connected to the Video 3 Audio/Video Inputs ㊲ has S-Video capability, connect this jack to the PLAY/OUT S-Video jack on that unit and then make certain that the S-Video Monitor Output ㉑ is connected as described above.

㉛ Video Monitor Output: Connect this jack to the composite video input of a TV monitor or video projector to view the on-screen menus and the output of a standard video source.

㉜ DVD Audio/Video Inputs: Connect the composite video and L/R analog audio outputs of a DVD player or other video source to these jacks.

㉝ Video 1 Audio/Video Inputs: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks.

㉞ Video 1 Audio/Video Outputs: Connect the composite or Video and L/R analog audio REC/IN jacks of a VCR or other video recording device such as a DVD recorder or PVR to these jacks.

㉟ Video 2 Audio/Video Inputs: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks.

㊱ Video 2 Audio/Video Outputs: Connect the composite or Video and L/R analog audio REC/IN jacks of a VCR or other video recording device such as a DVD recorder or PVR to these jacks.

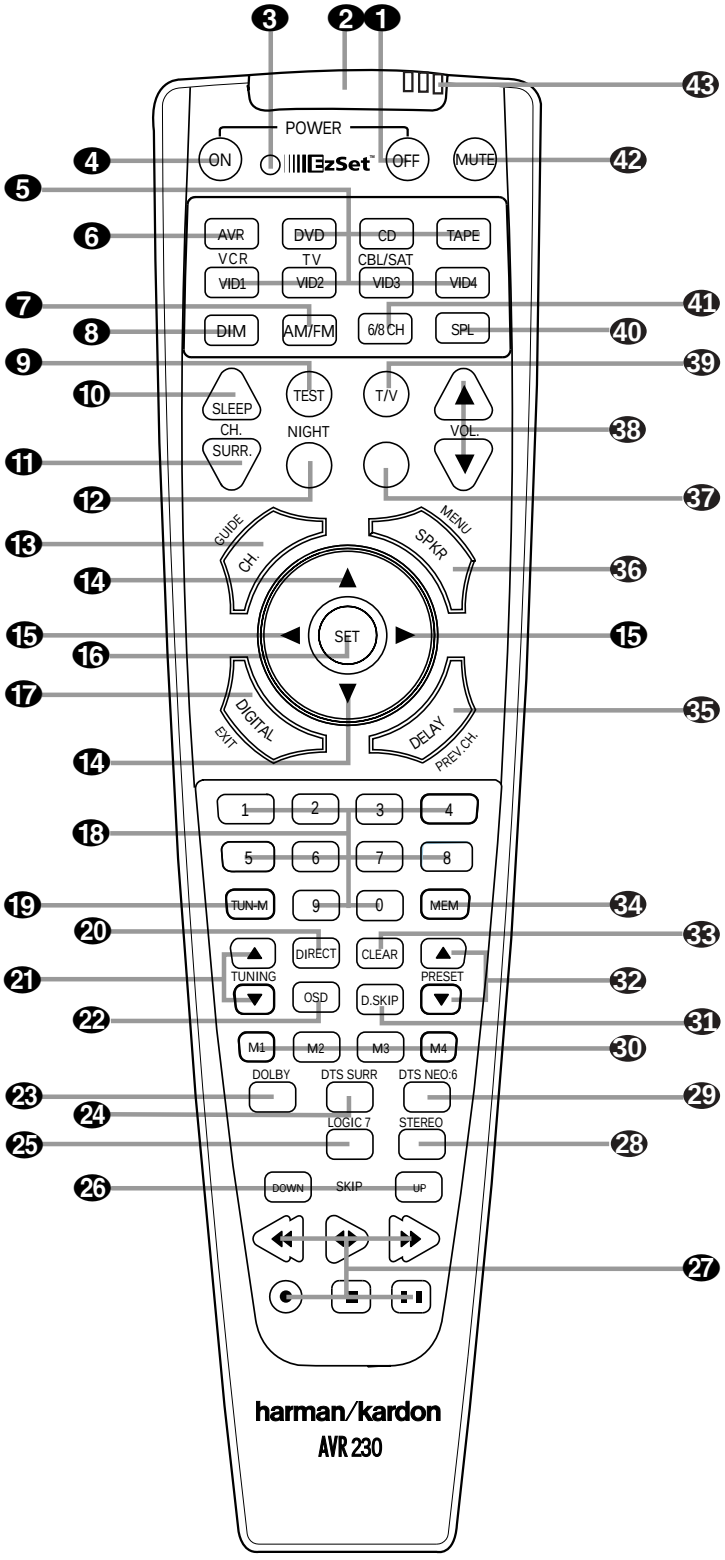
㊲ Video 3 Audio/Video Inputs: Connect the composite or Video and L/R analog audio PLAY/OUT jacks of a VCR or other video source to these jacks.

㊳ AM Antenna Terminals: Connect the AM loop antenna supplied with the receiver to these terminals. If an external AM antenna is used, make connections to the AM and GND terminals in accordance with the instructions supplied with the antenna.

Note on video connections: When connecting a video source product such as a VCR, DVD player, satellite receiver, cable set-top box, personal video recorder or video game to the AVR 230, you may use either a composite or S-Video connection, but not both.

MAIN REMOTE CONTROL FUNCTIONS

1. Power Off Button
2. IR Transmitter Window
3. Program/SPL Indicator
4. Power On Button
5. Input Selectors
6. AVR Selector
7. AM/FM Tuner Select
8. Dim Button
9. Test Button
10. Sleep Button
11. DSP Surround Mode Selector
12. Night Mode
13. Channel Select Button
14. ▲/▼ Buttons
15. ◄/► Buttons
16. Set Button
17. Digital Select
18. Numeric Keys
19. Tuner Mode
20. Direct Button
21. Tuning Up/Down
22. OSD Button
23. Dolby Mode Selector
24. DTS Digital Mode Selector
25. Logic 7 Mode Select Button
26. Skip Up/Down Buttons
27. Transport Controls
28. Stereo Mode Select Button
29. DTS Neo:6 Mode Select
30. Macro Buttons
31. Disc Skip Button
32. Preset Up/Down
33. Clear Button
34. Memory Button
35. Delay/Prev. Ch.
36. Speaker Select
37. Spare Button
38. Volume Up/Down
39. TV/Video Selector
40. SPL Selector
41. 6-Channel/8-Channel Direct Input
42. Mute
43. EzSet Sensor Microphone



NOTE:

- The function names shown here are each button's feature when used with the AVR 230. Most buttons have additional functions when used with other devices. See pages 36–37 for a list of these functions.
- To make it easier to follow the instructions that refer to this illustration, a larger copy may be downloaded from the Product Support section for this product at www.harmankardon.com.

IMPORTANT NOTE: The AVR 230's remote may be programmed to control up to eight devices, including the AVR 230. Before using the remote, it is important to remember to press the Input Selector Button ❺ that corresponds to the unit you wish to operate. In addition, the AVR 230's remote is shipped from the factory to operate the AVR 230 and most Harman Kardon CD or DVD players and cassette decks. The remote is also capable of operating a wide variety of other products using the control codes that are part of the remote. Before using the remote with other products, follow the instructions on pages 32–33 to program the proper codes for the products in your system.

It is also important to remember that many of the buttons on the remote take on different functions, depending on the product selected using the Device Control Selectors. The descriptions shown here primarily detail the functions of the remote when it is used to operate the AVR 230. (See page 33 for information about alternate functions for the remote's buttons.)

❶ Power Off Button: Press this button to place the AVR 230 or a selected device in the Standby mode. Note that this will turn off the main room functions, but if the Multiroom system is activated, it will continue to function.

❷ IR Transmitter Window: Point this window towards the AVR 230 when pressing buttons on the remote to make certain that infrared commands are properly received.

❸ Program/SPL Indicator: This three-color indicator is used to guide you through the process of programming the remote and it is also used as a level indicator when using the remote's EzSet capabilities. (See page 21 for more information on setting output levels, and see page 32 for information on programming the remote.)

❹ Power On Button: Press this button to turn on the power to a device selected by pressing one of the Input Selectors ❺.

❺ Input Selectors: Pressing one of these buttons will perform three actions at the same time. First, if the AVR 230 is not turned on, this will power up the unit. Next, it will select the source shown on the button as the input to the AVR 230. Finally, it will change the remote control so that it controls the device selected. After pressing one of these buttons you must press the AVR Selector Button ❻ again to operate the AVR 230's functions with the remote.

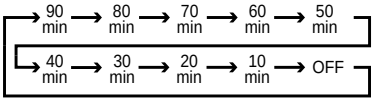
❻ AVR Selector: Pressing this button will switch the remote so that it will operate the AVR 230's functions. If the AVR 230 is in the Standby mode, it will also turn the AVR 230 on.

❼ AM/FM Tuner Select: Press this button to select the AVR 230's tuner as the listening choice. Pressing this button when the tuner is already in use will select between the AM and FM bands.

❽ Dim Button: Press this button to activate the Dimmer function, which reduces the brightness of the front panel display, or turn it off entirely. The first press of the button shows the default state, which is full brightness by indicating *DIMMER FULL* in the Lower Display Line 30. Press the button again within five seconds to reduce the brightness by 50%, as indicated by *DIMMER HALF* showing in the Lower Display Line 30. Press the button again within five seconds and the main display will go completely dark. Note that this setting is temporary, in that regardless of any changes, the display will always return to full brightness when the AVR is turned on. In addition, the Power Indicator 2 will always remain at full brightness regardless of the setting. This is to remind you that the AVR is still turned on.

❾ Test Button: Press this button to begin the sequence used to calibrate the AVR 230's output levels. (See page 21 for more information on calibrating the AVR 230.)

❿ Sleep Button: Press this button to place the unit in the Sleep mode. After the time shown in the display, the AVR 230 will automatically go into the Standby mode. Each press of the button changes the time until turn-off in the following order:



This button is also used to change channels on your TV when the TV is selected.

When the AVR 230 remote is being programmed with the codes to operate another device, this button is also used in the "Auto Search" process. (See page 32 for more information on programming the remote.)

⓫ DSP Surround Mode Selector: Press this button to cycle through the DSP, VMAx and Stereo surround modes such as Hall, Theater, VMAx Near and Far, and Surround Off. This button is also used to tune channels when the TV is selected using the device Input Selector ❺. When the AVR 230 remote is being programmed with the codes of another device, this button is also used in the "Auto Search" process. (See page 32 for more information on programming the remote.)

⓬ Night Mode: Press this button to activate the Night mode. This mode is available in specially encoded digital sources, and it preserves dialogue (center channel) intelligibility at low volume levels.

⓭ Channel Select Button: This button is used to start the process of setting the AVR 230's output levels to an external source. Once this button is pressed, use the ▲/▼ Buttons ⓮ to select the channel being adjusted, then press the Set Button ⓰, followed by the ▲/▼ Buttons ⓮ again, to change the level setting. (See page 29 for more information.)

⓮ ▲/▼ Buttons: These multipurpose buttons are used to change or scroll through items in the on-screen menus, make configuration settings such as digital inputs or delay timing, or to select surround modes. When changing a setting, first press the button for the function or setting to be changed (e.g., press the DSP Surround Mode Selector ⓫ to select a sound field mode or the Digital Select Button ⓱ to change a digital input) and then press one of these buttons to scroll through the list of options or to increase or decrease a setting. The sections in this manual describing the individual features and functions contain specific information on using these buttons for each application.

⓯ ◀/▶ Buttons: These buttons are used to change the menu selection or setting during some of the setup procedures for the AVR 230.

⓰ Set Button: This button is used to enter settings into the AVR 230's memory. It is also used in the setup procedures for delay time, speaker configuration and channel output level adjustment.

⓱ Digital Select: Press this button to assign one of the digital inputs 18 19 22 25 to a source. (See page 25 for more information on using digital inputs.)

⓲ Numeric Keys: These buttons serve as a 10-button numeric keypad to enter tuner preset positions. They are also used to select channel numbers when TV, Cable or SAT has been selected on the remote, or to select track numbers on a CD, DVD or LD player, depending on how the remote has been programmed.

⓳ Tuner Mode: Press this button when the tuner is in use to select between automatic tuning and manual tuning. When the button is pressed so that *MANUAL* appears in the Lower Display Line 30, pressing the Tuning Buttons ㉑ 9 will move the frequency up or down in single-step increments. When the FM band is in use, pressing this button when a station's signal is weak will change to monaural reception. (See page 28 for more information.)

⓴ Direct Button: Press this button when the tuner is in use to start the sequence for direct entry of a station's frequency. After pressing the button, simply press the proper Numeric Keys ⓲ to select a station. (See page 28 for more information on the tuner.)

㉑ Tuning Up/Down: When the tuner is in use, these buttons will tune up or down through the selected frequency band. If the Tuner Mode Button ⓳⓱ has been pressed so that *AUTO* appears in the on-screen display and Lower Display Line 30, pressing and holding either of the buttons for three seconds will cause the tuner to seek the next station with acceptable signal strength for quality reception. When *MANUAL* appears in the Lower Display Line 30, pressing these buttons will tune stations in single-step increments. (See page 28 for more information.)

㉒ OSD Button: Press this button to activate the On-Screen Display (OSD) system used to set up or adjust the AVR 230's parameters.

㉓ Dolby Mode Selector: This button is used to select from among the available Dolby Surround processing modes. Each press of this button will select one of the Dolby Pro Logic II modes or Dolby 3 Stereo. When a Dolby Digital-encoded source is in use, the Dolby Digital mode may also be selected. (See page 26 for the available Dolby surround mode options.)

㉔ DTS Digital Mode Selector: When a DTS-encoded digital source is selected, each press of this button will scroll through the available DTS modes. The specific choice of modes will vary according to whether or not the source material contains DTS-ES 6.1 Discrete encoding. When a DTS source is not in use, this button has no function. (See page 26 for the available DTS Digital options.)

㉕ Logic 7 Mode Select Button: Press this button to select from among the available Logic 7 surround modes. (See page 26 for the available Logic 7 options.)

㉖ Skip Up/Down Buttons: These buttons do not have a direct function with the AVR 230, but when used with a compatibly programmed CD or DVD changer they will change to the previous disc in the changer or carousel.

㉗ Transport Controls: These buttons do not have any functions for the AVR 230, but they may be programmed for the forward/reverse play operation of a wide variety of CD or DVD players, and audio or video cassette recorders. (See page 36 for more information.)

㉘ Stereo Mode Select Button: When the button is pressed so that *DSP SURR OFF* appears in the Lower Display Line 30, the AVR will operate in a bypass mode with true, fully analog, two-channel left/right stereo mode with no surround processing or bass management, as opposed to other modes where digital processing is used. When the button is pressed so that *SURROUND OFF* appears in the Lower Display Line 30, you may enjoy a two-channel presentation of the sound along with the benefits of bass management. Depending on whether your system is configured for 5.1 or 6.1/7.1 channels, the next press of the button will cause either *5 CH STEREO* or *7 CH STEREO* to appear, and the stereo signal will be routed to all five (or seven) speakers. (See page 26 for more information on stereo playback modes.)

㉙ DTS Neo:6 Mode Select: Press this button to select a DTS Neo:6 mode. These modes take a two-channel stereo- or matrix surround-encoded source and create a full five-, six- or seven-channel sound field. (See page 26 for the DTS Neo:6 options.)

㉚ Macro Buttons: Press these buttons to store or recall a "Macro", which is a preprogrammed sequence of commands stored in the remote. (See page 32 for more information on storing and recalling macros.)

㉛ Disc Skip Button: This button has no direct function for the AVR 230 but is most often used to change to the next disc in a CD or DVD player when the remote is programmed for that type of device. (See page 36 for more information on using the remote with products other than the AVR 230.)

㉜ Preset Up/Down: When the tuner is in use, press these buttons to scroll through the stations programmed into the AVR 230's memory. When some source devices, such as CD players, VCRs and cassette decks, are selected using the device Input Selectors ❺, these buttons may function as Chapter Step or Track Advance.

㉝ Clear Button: Press this button to clear incorrect entries when using the remote to directly enter a radio station's frequency.

㉞ Memory Button: Press this button to enter a radio station into the AVR 230's preset memory. First, tune the desired station, and then press this button. Two underline indicators will flash at the right side of the Upper Display Line 29, and within five seconds press the Numeric Keys ⓲ for the preset number between 01 and 30 that you wish to assign to the station. (See page 28 for more information.)

㉟ Delay/Prev Ch.: Press this button to begin the process for setting the delay times used by the AVR 230 when processing surround sound. After pressing this button, the delay times are entered by pressing the Set Button ⓰ and then using the ▲/▼ Buttons ⓮ to change the setting. Press the Set Button ⓰ again to complete the process. (See page 20 for more information.)

㊱ Speaker Select: Press this button to begin the process of configuring the AVR 230's bass management system for use with the type of speakers used in your system. Once the button has been pressed, use the ▲/▼ Buttons ⓮ to select the channel you wish to set up. Press the Set Button ⓰ and then select another channel to configure. When all adjustments have been completed, press the Set Button ⓰ twice to exit the settings and return to normal operation. (See page 18 for more information.)

㊲ Spare Button: This button has no direct function for the AVR 230.

㊳ Volume Up/Down: Press these buttons to raise or lower the system volume.

㊴ TV/Video Selector: This button does not have a direct function on the AVR 230, but when used with a compatible VCR, DVD or satellite receiver, pressing this button will switch between the output of the device and the external video input.

㊵ SPL Selector: This button activates the AVR 230's EzSet function to quickly and accurately calibrate the AVR 230's output levels. Press and hold the button for three seconds and then release it. Press the "5" or "7" Numeric Key ⓲ to indicate whether you are using a 5.1-channel or a 6.1/7.1-channel speaker system with the AVR 230. The test tone will begin circulating, and the Program/SPL Indicator ❸ will change colors. During this sequence, EzSet will automatically adjust the output levels for all channels until they are equal, as shown by the Program/SPL Indicator ❸ lighting green for each channel. Press this button again when the adjustment is complete to turn off the test tone. (See page 21 for more information on EzSet.)

㊶ 6-Channel/8-Channel Direct Input: Press this button to select the device connected to the 6/8-Channel Direct Inputs ㉙. (See page 24 for more information.)

㊷ Mute: Press this button to momentarily silence the AVR 230 or TV set being controlled, depending on which device has been selected. When the AVR 230 remote is being programmed to operate another device, this button is pressed with the Input Selector Button ❺ to begin the programming process. (See page 32 for more information on programming the remote.)

㊸ EzSet Sensor Microphone: The sensor microphone for the EzSet microphone is behind these slots. When using the remote to calibrate speaker output levels using EzSet, be sure that you do not hold the remote in a way that covers these slots. (See page 21 for more information on using EzSet.)

System Installation

After unpacking the unit, locating it in a place with adequate ventilation and placing it on a solid surface capable of supporting its weight, you will need to make the connections to your audio and video equipment.

IMPORTANT NOTE: For your personal safety and to avoid possible damage to your equipment and speakers, it is always a good practice to turn off and unplug the AVR and ALL source equipment from the AC output before making any audio or video system connections.

Audio Equipment Connections

We recommend that you use high-quality interconnect cables when making connections to source equipment and recorders to preserve the integrity of the signals.

1. Connect the analog output of a CD player to the CD Audio Inputs ❷.

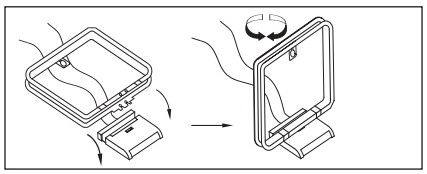
NOTE: When the CD player has both fixed and variable audio outputs, it is best to use the fixed output unless you find that the input to the receiver is so low that the sound is noisy, or so high that it is distorted.

2. Connect the analog Play/Out jacks of a cassette deck, MD, CD-R or other audio recorder to the Tape Input Jacks ❹. Connect the analog Record/In jacks on the recorder to the Tape Output Jacks ❸ on the AVR 230.

3. Connect the output of any digital sources such as a CD or DVD changer or player, advanced video game, a digital satellite receiver, HDTV tuner or digital cable set-top box or the output of a compatible computer sound card to the Optical and Coaxial Digital Audio Inputs ❷❺❶❽❶❾.

4. Connect the coaxial or optical Digital Audio Outputs ❶❾❷❿ on the rear panel of the AVR 230 to the matching digital input connections on a CD-R or MiniDisc recorder.

5. Assemble the AM Loop Antenna supplied with the unit so that the tabs at the bottom of the antenna loop snap into the holes in the base. Connect it to the AM Antenna Terminals ❸❽.



6. Connect the supplied FM antenna to the FM (75-ohm) Connection ❶. The FM antenna may be an external roof antenna, an inside powered or wire-lead antenna or a connection from a cable TV system. If the antenna or connection uses 300-ohm twin-lead cable, you must use the 300-ohm-to-75-ohm adapter supplied with the unit to make the connection.

7. Connect the front, center, surround and surround back speaker outputs ❾❿⓫❶ to the respective speakers.

To ensure that all the audio signals are carried to your speakers without loss of clarity or resolution, we suggest that you use high-quality speaker cable. Many brands of cable are available and the choice of cable may be influenced by the distance between your speakers and the receiver, the type of speakers you use, personal preferences and other factors. Your dealer or installer is a valuable resource to consult in selecting the proper cable.

Regardless of the brand of cable selected, we recommend that you use a cable constructed of multistrand copper with a gauge of 14 or smaller. Remember that in specifying cable, the lower the number, the thicker the cable.

Cable with a gauge of 16 may be used for short runs of less than 10 feet. We do not recommend that you use cables with an AWG equivalent of 18 or higher, due to the power loss and degradation in performance that will occur.

Cables that are run inside walls should have the appropriate markings to indicate listing with UL, CSA or other appropriate testing agency standards. Questions about running cables inside walls should be referred to your installer or a licensed electrician who is familiar with the NEC and/or the applicable local building codes in your area.

When connecting wires to the speakers, be certain to observe proper polarity. Note that the positive (+) terminal of each speaker connection may carry a specific color code, as noted on page 7. However, many speakers still use a red terminal for the positive (+) connection. Connect the "negative" or "black" wire to the same terminal on both the receiver and the speaker.

NOTE: While most speaker manufacturers adhere to an industry convention of using black terminals for negative and red ones for positive, some may vary from this configuration. To ensure proper phase and optimal performance, consult the identification plate on your speaker or the speaker's manual to verify polarity. If you do not know the polarity of your speaker, ask your dealer for advice before proceeding, or consult the speaker's manufacturer.

We also recommend that the length of cable used to connect speaker pairs be identical. For example, use the same length piece of cable to connect the front-left and front-right or surround-left and surround-right speakers, even if the speakers are a different distance from the AVR 230.

8. Connections to a subwoofer are normally made via a line-level audio connection from the Subwoofer Output ❽ to the line-level input of a subwoofer with a built-in amplifier. When a passive subwoofer is used, the connection first goes to a power amplifier, which will be connected to one or more subwoofer speakers. If you are using a powered subwoofer that does not have line-level input connections, follow the instructions furnished with the speaker for connection information.

9. If an external multichannel audio source with 5.1 outputs such as an external digital processor/decoder, DVD-Audio or SACD player is used, connect the outputs of that device to the 6/8-Channel Direct Inputs ❷❾.

External Amplifier Connections

The AVR 230's internal-power amplifier is a traditional Harman Kardon high-current/ultrawide bandwidth design. As such, it is more than suitable for most loudspeakers. However, in some circumstances you may wish to use an optional, external power amplifier for added power. This is easily done by connecting the Preamp Output Jacks ❼ on the AVR 230 to the input jacks on the amplifier for the channels to be used. The speakers to be used with the external amplifier are then connected to the appropriate output terminals on the power amplifier, not those on the AVR.

Since the AVR 230 is designed with a full seven-channel audio path for use with modes such as Dolby Digital EX and Logic 7/7.1, you may also wish to use an optional, external amplifier to include both back surround channels in your system. This is done by connecting the SBL and SBR Preamp Out Jacks ❼ on the AVR to the input jacks on the power amplifier. As is the case with the use of any external amplifier, the speakers are then connected to the appropriate output terminals on the external amplifier.

When an external amplifier is used for the Surround Back channels, no special adjustments are needed to the AVR, other than to make certain that the Surround Back speakers are properly configured to "Large" or "Small," as shown in the Speaker Setup section on page 18 of this manual. This is necessary to tell the AVR's digital processing system that 6.1/7.1 modes should be activated, as opposed to the default setting of 5.1 modes.

We also recommend that when an external amplifier is used for the Surround Back channels you use a stereo amplifier to feed both channels, although a single, mono amplifier may be used for one channel (e.g., SBL), while the AVR's internal amplifier feeds the other channel (e.g., SBR). The use of a stereo amplifier ensures that the two back channels will be fed with equal power.

Video Equipment Connections

Video equipment is connected in the same manner as audio components. Again, the use of high-quality interconnect cables is recommended to preserve signal quality.

1. Connect a VCR's, personal video recorder's or other video source's audio and video Play/Out jacks to the Video 1/Video 2 Audio/Video and/or S-Video Input Jacks 24 27 33 35 on the rear panel. The Audio and Video Record/In jacks on the VCR should be connected to the Video 1/Video 2 Audio/Video and/or S-Video Output Jacks 26 28 34 36 on the AVR 230.

2. Connect the analog audio and video outputs of a satellite receiver, cable TV converter, television set or any other video source to the Video 3 Audio/Video and S-Video Input Jacks 30 37.

3. Connect the analog audio and video outputs of a DVD or laser disc player to the DVD Audio/Video and S-Video Inputs 23 32.

4. Connect the digital audio outputs of a DVD player, satellite receiver, cable box or HDTV converter to the appropriate Optical or Coaxial Digital Inputs 22 25 18 19.

5. Connect the Video and/or S-Video Monitor Output 21 31 jacks on the receiver to the composite or S-Video input of your television monitor or video projector.

6. If your DVD player and monitor both have component video connections, connect the component outputs of the DVD player to the DVD Component Video Inputs 14. Even when component video connections are used, the audio connections should still be made to either the analog DVD Audio Inputs 32 or any of the Optical or Coaxial Digital Input Jacks 22 25 18 19.

7. If another device with component video outputs is available, connect it to the Video 2 Component Video Inputs 13. The audio connections for this device should be made to either the Video 2 Audio Inputs 35 or any of the Optical or Coaxial Digital Input Jacks 22 25 18 19.

8. If the component video inputs are used, connect the Component Video Monitor Outputs 15 to the component video inputs of your TV, projector or display device.

9. If you have a camcorder, video game or other audio/video device that is connected to the AVR on a temporary rather than permanent basis, connect the audio, video and digital audio outputs of that device to the Front-Panel Inputs 18 19 20 21. A device connected here is selected as the Video 4 input, and the digital inputs must be assigned to the Video 4 input. (See page 17 for more information on input configuration.)

Video Connection Notes:

- When the component video jacks are used, the on-screen menus are not visible and you must switch to the standard composite or S-Video input on your TV to view them.
- The AVR 230 will accept either standard composite, S-Video or Y/Pr/Pb component video signals. However, it will not convert composite or S signals to component video.
- When connecting a video source to the AVR 230, you may use either composite, component or S-Video, but only one type of video may be connected for each device.
- When more than one video format is used, it is necessary to make a separate connection from the AVR to your video display for each format. For example, if both composite and component sources are connected to the AVR 230, both the composite and component video monitor outputs 15 31 must be connected to the appropriate inputs on your video display.

System and Power Connections

The AVR 230 is designed for flexible use with multi-room systems, external control components and power amplifiers.

Remote Control Extension

If the receiver is placed behind a solid or smoked glass cabinet door, the obstruction may prevent the remote sensor from receiving commands. In this event, an optional remote sensor may be used. Connect the output of the remote sensor to the Remote IR Input 5 jack.

If other components are also prevented from receiving remote commands, only one sensor is needed. Simply use this unit's sensor or a remote eye by running a connection from the Remote IR Output 6 jack to the Remote IR Input jack on Harman Kardon or other compatible equipment.

AC Power Connections

This unit is equipped with two accessory AC outlets. They may be used to power accessory devices, but they should not be used with high-current-draw equipment such as power amplifiers. The total power draw to each outlet may not exceed 100 watts.

The Switched AC Accessory Outlet 17 will receive power only when the unit is on. This is recommended for devices that have no power switch or a mechanical power switch that may be left in the "ON" position.

NOTE: Many audio and video products go into a Standby mode when they are used with switched outlets, and cannot be fully turned on using the outlet alone without a remote control command.

The Unswitched AC Accessory Outlet 18 will receive power as long as the unit is plugged into a powered AC outlet.

Once the AC Power Cord 16 is connected, you are almost ready to enjoy the AVR 230's incredible power and fidelity!

When all audio, video and system connections have been made, there are a few configuration adjustments that must be made. A few minutes spent to correctly configure and calibrate the unit will greatly add to your listening experience.

Speaker Selection and Placement

The placement of speakers in a multichannel home theater system can have a noticeable impact on the quality of sound reproduced.

No matter which type or brand of speakers is used, the same model or brand of speaker should be used for the left front, center and right front speakers. This creates a seamless front soundstage and eliminates the possibility of distracting sonic disturbances that occur when a sound moves across mismatched front-channel speakers.

Speaker Placement

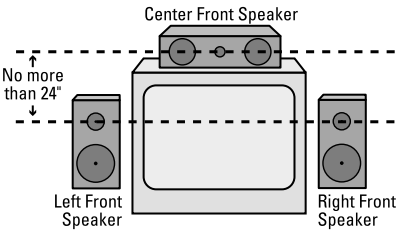
Depending on the type of center channel speaker in use and your viewing device, place the center speaker either directly above or below your TV, or in the center behind a perforated front projection screen.

Once the center channel speaker is installed, position the front left and front right speakers so that they are as far away from one another as the center channel speaker is from the preferred listening position. Ideally, the front channel speakers should be placed so that their tweeters are no more than 24" above or below the tweeter in the center channel speaker.

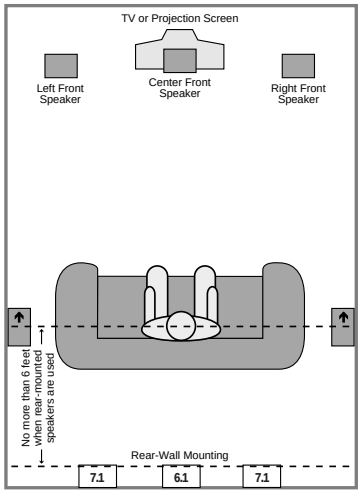
Depending on the specifics of your room acoustics and the type of speakers in use, you may find that imaging is improved by moving the left front and right front speakers slightly forward of the center channel speaker. If possible, adjust all front loudspeakers so that they are aimed at ear height when you are seated in the listening position.

Using these guidelines, you'll find that it takes some experimentation to find the correct location for the front speakers in your particular installation. Don't be afraid to move things around until the system sounds correct. Optimize your speakers so that audio transitions across the front of the room sound smooth, and sounds from all speakers appear to arrive at the listening position at the same time (without delay from the center speaker compared to the left and right speakers).

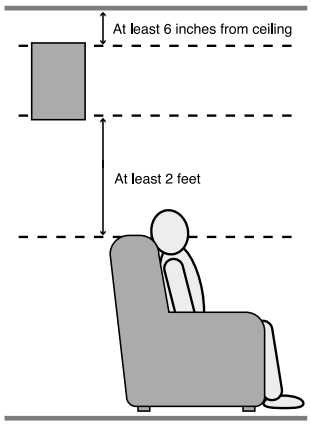
When the AVR 230 is used in 5.1-channel operation, the preferred location for surround speakers is on the side walls of the room, at or slightly behind the listening position. In a 6.1-channel system, both side surround speakers and a back surround speaker are required. The center of the speaker should face into the room. The speakers should be located so that the bottom of the cabinet is at least two feet higher than the listeners' ears when the listeners are seated in the desired area.



A) Front-channel speaker installation with direct-view TV sets or rear-screen projectors



B) Rear-wall speaker mounting using the positions marked "7.1" is an alternate location for 5.1 systems, and it should also be used for full 7.1 systems when an optional, external power amplifier is used to power the rear speakers. When the AVR's internal amplifier only is used for a 6.1 speaker configuration, the position marked "6.1" should be used.



Rear surround speaker mounting locations will vary according to the requirements of your specific system. If you are using the AVR 230's internal amplifiers only, the rear surround speaker should be mounted as close as possible to the center of the rear wall for a "6.1" system. If an optional, external power amplifier is available so that both the Surround Back Left and Surround Back Right channels are in use, place the speakers on the rear wall, as shown in the diagram below left. The rear wall location may also be used in place of side-wall mounting in 5.1 systems when it is not practical to place the main surround speakers at the sides of the room.

As with the side speakers, rear surround speakers should be located so that the bottom of the cabinet is at least two feet higher than the listeners' ears. The speakers should be no more than six feet behind the rear of the seating area.

If dipole-type speakers are used on either the side or rear walls of the room, please note that if there are arrows on the speakers they should face the front of the room for the side speakers, or toward the center of the wall for the rear speakers.

Subwoofers produce nondirectional sound, so they may be placed almost anywhere in a room. Actual placement should be based on room size and shape and the type of subwoofer used. One method of finding the optimal location for a subwoofer is to begin by placing it in the front of the room, about six inches from a wall, or near the front corner of the room. Another method is to temporarily place the subwoofer at your normal listening position, and then walk around the room until you find a spot where the subwoofer sounds best. Place the subwoofer in that spot. You should also follow the instructions of the subwoofer's manufacturer, or you may wish to experiment with the best location for a subwoofer in your listening room.

System Setup

Once the speakers have been placed in the room and connected, the remaining steps in the setup process are to program the AVR 230's bass management system for the type of speakers used in your system, calibrate the output levels, and set the delay times used by the surround sound processor.

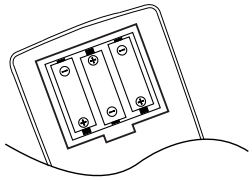
You are now ready to power up the AVR 230 to begin these final adjustments.

1. Make certain that the AC power cord ⑯ is firmly inserted into an unswitched AC outlet. To maintain the unit's safety rating, DO NOT substitute the power cord for one with lower current capacity.

2. Press the Main Power Switch 1 in until it latches and the word "OFF" on the top of the switch disappears inside the front panel. Note that the Power Indicator 2 will turn amber, indicating that the unit is in the Standby mode.

3. Remove the protective plastic film from the front-panel lens. If left in place, the film will affect the performance of your remote control.

4. Install the three supplied AAA batteries in the remote as shown. Be certain to follow the (+) and (–) polarity indicators that are on the top of the battery compartment.



5. Turn the AVR 230 on either by pressing the Standby/On Switch 2 on the front panel, or via the remote by pressing the Power On Button 4, the AVR Selector 6 or any of the Input Selectors 5 7 on the remote. When the unit is turned on, the entire list of options will briefly light for both the Input Indicators 27 and the Surround Mode Indicators 31. After a few seconds, the majority of those indicators will go dark, leaving only the indications for the active surround mode and input illuminated. The Display Lines 29 30 will display the unit's status, the Power Indicator 2 will turn blue, and the accent light inside the Volume Control 26 will also light up to remind you that the unit is turned on.

Using the On-Screen Display

When making the following adjustments, you may find it easier to use the AVR 230's on-screen display system. These easy-to-read displays give you a clear picture of the current status of the unit and make it easy to see which speaker, delay, input or digital selection you are making.

To view the on-screen menus, make certain that you have made a connection from the Video or S-Video Monitor Out Jack 21 31 on the rear panel to the composite or S-Video input of your TV or projector. In order to view the AVR 230's displays, the correct video source must be selected on the video display. The on-screen menus are not available when a component video display is in use.

IMPORTANT NOTE: When viewing the on-screen menus using a CRT-based projector, plasma display or any direct-view CRT monitor or television, it is important that they not be left on the screen for an extended period of time. The constant display of a static image such as these menus or video game images may cause the image to be permanently "burned into" the projection tubes, plasma screen or CRT. This type of damage is not covered by the AVR 230 warranty and may not be covered by the projector/TV set's warranty.

The AVR 230 has two on-screen display modes, "Semi-OSD" and "Full-OSD." When making configuration adjustments, it is recommended that the Full-OSD mode be used. This will place an option listing on the screen, making it easier to view the available options.

Making Configuration Adjustments

The full-OSD system is available by pressing the OSD Button 22. When this button is pressed, the MASTER MENU (Figure 1) will appear, and adjustments are made from the individual menus.

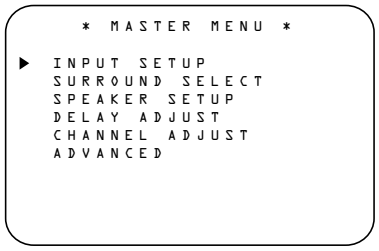


Figure 1

The semi-OSD system is also available, allowing you to make adjustments directly, by pressing the appropriate buttons on the front panel or remote control for the specific parameter to be adjusted. For example, to change the digital input for any of the sources, press the Digital Select Button 17 and then press the ▲/▼ Buttons 14 to scroll through the list of options as they appear in the on-screen display or the Lower Display Line 30.

To use the full-OSD menu system, press the OSD Button 22. When the menu is on the screen, press the ▲/▼ Buttons 14 until the on-screen ▶ cursor is next to the item you wish to adjust, and then press the Set Button 16 to adjust that item. The menus will remain on the screen for 20 seconds, and then they will "time-out" and disappear from the screen. The time-out may be increased to as much as 50 seconds by going to the ADVANCED menu, and changing the item titled FULL OSD TIME OUT.

When the full-OSD menu system is used, OSD ON will appear in the Upper Display Line 29 to remind you that a video display must be used. When the semi-OSD system is used in conjunction with the discrete configuration buttons, the on-screen display will show the current menu selection. That selection will also be shown in the Upper Display Line 29 or the Lower Display Line 30, depending on which parameter is being adjusted.

Setting the System Configuration Memory

The AVR 230 features an advanced memory system that enables you to establish different configurations for the digital input, surround mode, delay times and output levels for each input source. This flexibility enables you to customize the way in which you listen to each source and have the AVR 230 memorize those settings. This means, for example, that you may use different output levels or trims for different sources. Once these settings are made, they will automatically be recalled whenever you select that input. In addition to the settings listed above, which always vary with the input, you may also choose to set different speaker configurations for size and crossover frequency for each input. In most cases, this is not required, so the factory default is to have these settings remain the same for all inputs. However, should you wish to have these settings change for any one, or all, inputs, follow the instructions shown on page 20 to select the Independent mode for speaker configuration.

The factory default settings for the AVR 230 have all inputs configured for an analog audio input except for the DVD input, where the Coaxial Digital Audio Input 1 22 is the default. The default speaker settings are for "Large" speakers at the front left/right, "Small" at all other positions, and the subwoofer on. However, once the DSP processing system is used the first time for any input, the speaker settings will automatically default to "Small" at all positions with the subwoofer set to "LFE." The default setting for all sources using an analog input is the Logic 7 Music mode, although Dolby Digital or DTS will automatically be selected as appropriate when a source with digital encoding is in use. When a Dolby Digital 2.0 source is detected, the AVR 230 will automatically add Dolby Pro Logic II processing.

Before using the unit, you will probably want to change the settings for most inputs so that they are properly configured to reflect the use of digital or analog inputs and the surround mode specifics of your home theater system. Remember that since the AVR 230 memorizes these settings for each input individually, you will need to make these adjustments for each input used. However, once they are made, further adjustment is only required when system components are changed.

To make this process as quick and easy as possible, we suggest that you use the full-OSD system with the on-screen menus, and step through each input. Once you have completed the settings for the first input, many settings may be duplicated for the remaining inputs. It is also a good idea to set the configuration data in the order these items are listed in the MASTER MENU, as some settings require a specific entry in a prior menu item. Remember that once the settings are made for one input, they must be made for all other input sources in your system.

Input Setup

The first step in configuring the AVR 230 is to configure each input. Once an input is selected, all settings for the Digital Input, Surround Mode and Delay Timing will "attach" themselves to that input and be stored in a nonvolatile memory. This means that once made, the selection of an input will automatically recall those settings. For that reason, the procedures described below must be repeated for each input source so that you have the opportunity to customize each source to your specific listening requirements. However, once made, they need not be changed again unless you need to alter a setting.

When using the full-OSD system to make the setup adjustments, press the OSD Button 22 once so that the MASTER MENU (Figure 1) appears. The ▶ cursor will be next to the INPUT SETUP line. Press the Set Button 16 to enter the menu and the INPUT SETUP menu (Figure 2) will appear on the screen. Press the ◀/▶ Buttons 15 until the desired input name appears in the highlighted video, as well as being indicated in the front-panel Input Indicators 27. If the input will use the standard left/right analog inputs, no further adjustment is needed.

```
      * INPUT SETUP *

▶  INPUT :VIDEO 1
   DIGITAL IN :ANALOG

   BACK TO MASTER MENU
```

Figure 2

If you wish to associate one of the digital inputs with the selected input source, press the ▼ Button 14 on the remote while the INPUT SETUP menu (Figure 2) is on the screen, and the on-screen cursor will drop down to the DIGITAL IN line. Press the ◀/▶ Buttons 15 until the name of the desired digital input appears. To return to the analog input, press the buttons until the word ANALOG appears.

When the correct input source appears, press the ▼ Button 14 once so that the ▶ cursor appears next to *BACK TO MASTER MENU*, and press the Set Button 16.

To change the digital input at any time using the discrete function buttons and the semi-OSD system, press the Digital Select Button 17 on the remote. Within five seconds, make your input selection using the ▲/▼ Buttons 14 until the desired digital or analog input is shown in the Upper Display Line 29 and in the lower line of the on-screen display. Press the Set Button 16 to enter the new digital input assignment.

When all needed adjustments have been made, press the ▼ Button 14 until the ▶ cursor is next to BACK TO MASTER MENU to continue with the system configuration.

Surround Setup

The next step is to set the surround mode you wish to use with the input that was previously selected in the INPUT menu. Since surround modes are a matter of personal taste, feel free to select any mode you wish – you may change it later. However, to make it easier to establish the initial parameters for the AVR 230, it is best to select Dolby Pro Logic II or Logic 7 for most analog inputs and Dolby Digital for inputs connected to digital sources. In the case of inputs such as a CD Player, Tape Deck or Tuner, you may wish to set the mode to Stereo ("Surround off") as they are not typically used with multichannel program material, and it is unlikely that surround-encoded material will be used. Alternatively, the Logic 7 Music mode is a good choice for stereo-only source material. See page 26 for more information on available surround modes.

When selecting surround modes for digital program material, the AVR 230 will always examine the data stream and automatically select Dolby Digital or DTS as applicable.

It is easiest to complete the surround setup using the full-OSD on-screen menus. From the *MASTER MENU* (Figure 1), press the ▲/▼ Buttons 14 until the ▶ cursor is next to the *SURROUND SELECT* line. Press the Set Button 16 until the *SURROUND SELECT* menu (Figure 3) is on the screen.

```
   * SURROUND SELECT *

▶  DOLBY
   DTS
   LOGIC 7
   DSP <SURR>
   VMAX
   STEREO

   BACK TO MASTER MENU
```

Figure 3

Each of the option lines on this menu (Figure 3) selects the surround mode category, and within each of those categories there will be a choice of the specific mode options. The choice of modes will vary according to the speaker configuration in your system. When the *SURR BACK* line of the *SPEAKER SETUP* menu (Figure 5) is set to *NONE* the AVR 230 will be configured for 5.1-channel operation, and only the modes appropriate to a five-speaker system will appear. When the *SURR BACK* line of the *SPEAKER SETUP* menu (Figure 5) is set to *SMALL* or *LARGE* the AVR 230 will be configured for 6.1/7.1-channel operation, and additional modes such as Dolby Digital EX and DTS-ES will appear, as they are only available when seven main speakers are present. In addition, some of the modes available in the AVR 230 will not appear unless a digital source is selected and is playing the correct bitstream. Remember that when you use only the AVR 230's internal amplifier and a single, surround back speaker, you will get all the benefits of a 6.1/7.1 system, but with only one speaker installed at the back of the room. The mode indications will show 7.1 in some cases, but no additional adjustment is needed for 6.1 operation.

To select the mode that will be used as the initial default for an input, first press the ▲/▼ Buttons 14 until the on-screen cursor is next to the desired mode's master category name, such as DOLBY, DTS, DSP <SURR> or *VMAX*. Next, press the Set Button 16 to view the sub-menu. Press the ◀/▶ Buttons 15 to scroll through the available choices, and then press the ▼ Button 14 so that the cursor is next to *BACK TO MASTER MENU* to continue the setup process.

The following few paragraphs detail the instructions needed for modes with multiple choices.

On the *DOLBY* menu (Figure 4), choices include Dolby Digital, Dolby Pro Logic II-Music, Dolby Pro Logic II-Movie, Dolby Pro Logic and Dolby 3 Stereo. The Dolby Digital EX mode is only available when the system is set for 6.1/7.1 operation by configuring the Surround Back speakers to "Small" or "Large" as described on page 19. When a disc is playing that

contains a special “flag” signal in the digital audio data stream, the EX mode will be selected automatically. It may also be selected using this menu or through the front panel or remote controls as shown on page 24. A complete explanation of these modes is found on page 26.

When the Dolby Digital mode is selected, there are additional settings available for the Night mode.

Figure 4

The Night mode is a feature of Dolby Digital that uses special processing to preserve the dynamic range and full intelligibility of a movie soundtrack while reducing the peak level. This prevents abruptly loud transitions from disturbing others, without reducing the sonic impact of a digital source. The Night mode is only available when specially encoded Dolby Digital signals are played.

To adjust the Night mode setting, make certain that the ▶ cursor is on the NIGHT line of the DOLBY menu. Next, press ◀/▶ Buttons ⓯ to choose between the following settings, as they appear in the on-screen display:

OFF: When OFF is highlighted, the Night mode will not function.

MID: When MID is highlighted, a mild compression will be applied.

MAX: When MAX is highlighted, a more severe compression algorithm will be applied.

We recommend that you select the MID setting as a starting point and change to the MAX setting later, if desired.

The Night mode may also be adjusted directly any time a Dolby Digital source is playing by pressing the Night Mode Button ⓬. When the button is pressed, D-RANGE will appear in the lower third of the video screen and in the

(Figure 5). If that menu is not already on your screen from the prior adjustments, press the OSD Button 22 to bring up the MASTER MENU (Figure 1), and then press the ▼ Button 14 until the cursor is on the SPEAKER SETUP line. At this point, press the Set Button 16 to bring up the SPEAKER SETUP menu (Figure 5).

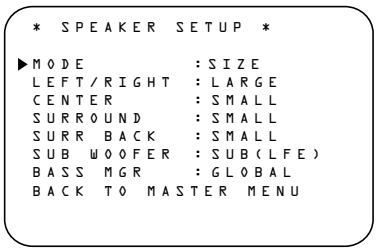


Figure 5

The first line of the *SPEAKER SETUP* menu (Figure 5) allows you to switch the menu to change either the speaker size setting or the exact crossover point used for that speaker group. For the first pass through the menu, leave the setting at its default option of *SIZE*, and then proceed as outlined below. Once the speaker choices have been set, you may wish to return to this line to change the option so that the crossover settings may be adjusted.

Begin the speaker setup process by making certain that the cursor is pointing toward the LEFT/RIGHT line, which sets the configuration for the front left and right speakers. If you wish to make a change to the front speakers' configuration, press the ◀/▶ Buttons 15 so that either LARGE or SMALL appears, matching the appropriate description from the definitions shown above.

When SMALL is selected, low-frequency sounds will be sent only to the subwoofer output. If you choose this option and there is no subwoofer connected, you will not hear any low-frequency sounds from the front channels.

When LARGE is selected, a full-range output will be sent to the front left and front right outputs. Depending on the choice made in the SUBWOOFER line in this menu, bass information may also be directed to the front left/right speakers, a subwoofer or both.

NOTE: When the front speakers are set to LARGE and the surround mode is set to "Surround Off", or pure two-channel stereo, if an analog audio source is selected, it will be routed directly from the input to the volume control without being digitized or processed. If you have full-range front speakers and wish to remove all digital processing from the circuit path, select this configuration. If you wish to use this option with only one input, such as a CD player or an optional, external phono preamp, choose the *INDEPENDENT* setting on the *BASS MGR* line at the bottom of this menu so that only those inputs where the analog bypass is desired will be routed in this fashion.

When you have completed your selection for the front channel, press the ▼ Button 14 on the remote to move the cursor to CENTER.

Press the ◀/▶ Buttons 15 on the remote to select the option that best describes your system, based on the speaker definitions shown below.

When SMALL is selected, low-frequency center channel sounds will be sent only to the subwoofer output. If you choose this option and there is no subwoofer connected, you will not hear low-frequency sounds from the center channel.

When LARGE is selected, a full-range output will be sent to the center speaker output, and NO center channel signal will be sent to the subwoofer output.

NOTE: If you choose Logic 7 as the surround mode the "large" option will not be available for the center speaker. This is due to the requirements of Logic 7 processing, and does not indicate a problem with your receiver.

When NONE is selected, no signals will be sent to the center channel output. The receiver will operate in a "phantom" center channel mode and center channel information will be sent to the left and right front channel outputs. When only front left and right speakers are used, with no center or surround speakers, VMAx is a good alternative mode.

When you have completed your selection for the center channel, press the ▼ Button 14 on the remote to move the cursor to SURROUND.

Press the ◀/▶ Buttons 15 on the remote to select the option that best describes the surround speakers in your system based on the speaker definitions shown on this page.

When SMALL is selected, low-frequency surround channel sounds will be sent to the subwoofer output only. If you choose this option and there is no subwoofer connected, you will not hear any low-frequency sounds from the surround channel.

When LARGE is selected, a full-range output will be sent to the surround channel outputs, and NO surround channel signals will be sent to the subwoofer output.

When NONE is selected, surround sound information will be split between the front left and front right outputs. For optimal performance when no surround speakers are in use, the Dolby 3 Stereo mode should be used.

NOTE: In order to adjust the speaker settings for the surround back channels, either a Logic 7 or DTS Neo:6 mode must first be selected or a multichannel, Dolby Digital or DTS source must be playing. This enables the system to activate the surround back processing mode.

When you have completed your selections for the main surround channels, press the ▼ Button 14 on the remote to move the cursor to *SURR BACK*. This line serves two functions in that it not only configures the setting for the surround back channels when they are present; it also tells the AVR 230's processing system to configure the unit for either 5.1 or 6.1/7.1 operation.

Press the ◀/▶ Buttons 15 on the remote to select the option that best describes the speakers in use at the left and right back surround positions based on the definitions on this page:

When *NONE* is selected, the system will adjust so that only 5.1-channel surround processing/decoding modes are available.

When *SMALL* is selected, the system will adjust so that the full complement of 6.1/7.1 surround processing/ decoding modes are available, and low-frequency information below the crossover point will be sent to the subwoofer output. If you choose this option and there is no subwoofer connected, you will not hear any low-frequency sounds from the surround back channel.

When *LARGE* is selected, the system will adjust so that the full complement of 6.1/7.1 surround processing/decoding modes are available, and a full-range signal will be sent to the surround back channels, with no low-frequency information sent to the subwoofer output.

NOTE: There is no difference in the setting for the Surround Back speakers when either one speaker is present for 6.1 operation using the internal amplifier or two speakers are present for 7.1 operation in conjunction with an optional, external power amplifier.

When you have completed your selection for the back surround channels, press the ▼ Button 14 on the remote to move the cursor to SUBWOOFER.

Press the ◀/▶ Buttons 15 on the remote to select the option that best describes your system.

The choices available for the subwoofer position will depend on the settings for the other speakers, particularly the front left/right positions.

If the front left/right speakers are set to SMALL, the subwoofer will automatically be set to SUB, which is the "on" position.

If the front left/right speakers are set to LARGE, three options are available:

- If no subwoofer is connected to the AVR 230, press the ◀/▶ Buttons ⑮ on the remote so that NONE appears in the on-screen menu. When this option is selected, all bass information will be routed to the front left/right "main" speakers.

- If a subwoofer is connected and you wish to have the front left/right "main" speakers reproduce bass frequencies at all times, and have the subwoofer operate only when the AVR 230 is being used with a digital source that contains a dedicated Low-Frequency Effects, or LFE, soundtrack. Press the ◀/▶ Buttons ⑮ on the remote so that LFE appears in the on-screen menu.

- If a subwoofer is connected and you wish to use it for bass reproduction in conjunction with the main front left/right speakers, regardless of the type of program source or Surround mode, press the ◀/▶ Buttons ⑮ on the remote so that SUB LFE+L/R appears in the on-screen menu. When this option is selected, a full-range signal will be sent to the front left/right "main" speakers, and the subwoofer will receive the bass frequencies under frequency selected, as described below, as well as the LFE information.

When all initial speaker "size" settings have been made, you now have the option to take advantage of the AVR 230's Triple Crossover system, which allows individual crossover settings to be made for each speaker grouping. The low-frequency crossover point is set by the design of your speakers. Depending on the design and driver complement of your speakers, it is defined as the frequency which is either the lowest possible frequency the speaker is capable of reproducing, or the frequency at which sound is sent to the speaker's internal low-frequency driver, as opposed to the mid-range driver. Before making any changes to the settings for the crossover point, we suggest that you find the crossover point for the speakers in each of the three groupings, front left/right, center and surrounds, by looking at the specifications page of each speakers' owner's manual, or by contacting your dealer or the manufacturer's customer service department or Web site. You will need this figure to accurately configure the next group of settings.

The factory default setting for all speaker positions is 100Hz. If that setting is acceptable for all channels, then no adjustments are needed and you may skip this section. However, should you wish to change one of the settings, please proceed by pressing the ▲ Button ⑭ so that the cursor moves back up to the top of the list of setting options. Press the ▲/▼ Buttons ⑭ so that *X-OVER* is highlighted and the menu data will change to the screen shown in Figure 6.

```
** SPEAKER SETUP **

MODE          :X-OVER
LEFT/RIGHT:100HZ
CENTER        :100HZ
SURROUND      :100HZ
SURR BACK     :-----
SUBWOOFER     :SUB (LFE)
BASS MGR      :GLOBAL
BACK TO MASTER MENU
```

Figure 6

To change the setting for any of the three speaker groups, press the ▲/▼ Buttons ⑭ until the cursor is next to the line where you wish to make a change and then press the ◀/▶ Buttons ⑮ until the desired setting appears. The available choices at which point low-frequency information will be sent to the subwoofer, rather than to the main speaker channel, are 40Hz, 60Hz, 80Hz, 100Hz, 120Hz and 200Hz. Pick the choice that is identical to the information for the speakers, or if an exact match is not possible, pick the closest choice that is ABOVE the speaker's low-frequency limit or crossover point to avoid the creation of a low-frequency "hole" where your system will have no bass information.

In cases where *LARGE* has been selected as the front-channel speaker option and *LFE+L/R* has been selected as the subwoofer option, the front-channel sound information below the setting shown will be sent to BOTH the front-channel speakers and the subwoofer. Note, also, that when the *LARGE-LFE+L/R* setting has been selected, the crossover point is set by making adjustments at the *SUBWOOFER* line, but the setting for the front left/right speakers will automatically change in tandem so that the same setting appears for both speaker positions. This ensures that there is no "hole" in the sound field due to different crossover points at the front and subwoofer speakers.

When all crossover settings have been made, or in those cases where none are needed, press the ▼ Button ⑭ so that the cursor is next to the *BASS MGR* line to make the final setting on this menu.

This setting allows you to use the same speaker configuration, crossover settings and output levels for all inputs, or to have different settings for each input. In most cases the factory default setting of *GLOBAL* will be appropriate, as most listeners do not need to have individualized settings. However, some listeners, particularly those with full-range front speakers that are used for both movies and music, may prefer that different crossover points be used when listening to music through a CD player as opposed to a movie from a DVD player, VCR or cable/satellite set-top.

If you wish to customize the speaker settings and output levels for each input, make certain that the cursor is on the *BASS MGR* line and press the ◀/▶ Buttons ⑮ so that *INDEPENDENT* appears. When this setting is entered by exiting the menu, you may need to go back to the *INPUT* menu to select another input, and then return to this menu page again to change the settings for that input. Repeat the procedure for any input where you wish to have a different set of speaker configuration and crossover settings.

When all speaker selections have been made, press the ▼ Button ⑭ and then the Set Button ⑯ to return to the *MASTER* MENU.

Delay Settings

Due to the different distances between the listening position for the front channel speakers and the surround speakers, the amount of time it takes for sound to reach your ears from the front versus surround speakers differs. You may compensate for this difference through the use of the delay settings to adjust the timing for the speaker placement and acoustic conditions in your listening room or home theater.

The AVR 230's advanced software enables you to quickly and easily set delay times without the need to calculate them using a complex formula. Instead, all you need to do is measure the approximate distance between your listening position and each of the speakers in your system. When you enter those distances into the AVR's memory as shown below, the AVR's microprocessor does the rest of the work, calculating the proper delay time. The measurements need not be accurate to the inch, as the system is designed to accommodate a typical listening area rather than require the precise measurement to one "sweet spot" position.

Due to the differences in the way each surround mode operates, some modes allow for a greater range of delay times than others. To avoid problems, we recommend that delay times be adjusted using the Dolby Digital mode. If a different mode is selected at a later time, the AVR 230 will automatically restrict the delay settings to those required by the surround mode in use.

Delay times are only adjustable for the Dolby modes, so you will notice that the DELAY menu may not be accessed when any other mode, such as a DTS or Logic 7 option, has been selected. In addition, when a non-Dolby Digital mode such as Dolby 3 Stereo or Pro Logic II is selected, adjustments may be made to the Surround speakers only.

To set the delay time for a specific input, the DELAY ADJUST menu (Figure 7) should be visible on your on-screen display. If the system is not already at that point, press the OSD Button 22 to bring up the MASTER MENU, press the ▼ Button 14 until the on-screen ▶ cursor is pointing at the DELAY ADJUST line. Press the Set Button 16 to call up the menu.

NOTE: In order to adjust the Delay settings for the surround back channels, a Dolby Digital or DTS source must be playing. This enables the system to activate the surround back processing mode.

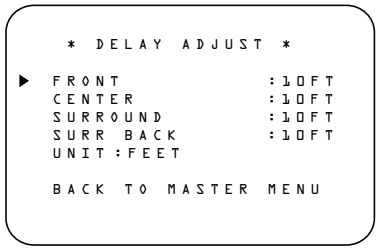


Figure 7

Once the DELAY ADJUST menu is on your screen, note that the default setting to enter the distances from the speakers to the listening position is in feet. If your measurements are in feet, proceed to the next step; if your measurements are made in meters, press the ▼ Button 14 until the on-screen ▶ cursor is at the UNIT line on the menu. Then, press the ◀/▶ Buttons 15 so that METER is highlighted. When the change in measurement units is made, press the ▲/▼ Buttons 14 to return the ▶ cursor to the CENTER position.

With the on-screen ▶ cursor pointing to CENTER, press the ◀/▶ Buttons 15 until the distance from the center speaker to the preferred listening position is entered. Next, press the ▼ Button 14 to move the cursor to the SURROUND line and use the ◀/▶ Buttons 15 again to enter the distance from the video display at the front of the room to the surround speakers. Finally, if the system is configured for 7.1 operation by entering LARGE or SMALL on the SURR BACK line of the SPEAKER SETUP menu, press the ▼ Button 14 again and use the ◀/▶ Buttons 15 to enter the distance from the listening position to the surround speakers. Remember that this last adjustment will only be needed when you have surround back speakers installed and Dolby Digital chosen as the surround mode.

When the speaker-to-listening-position distance has been entered for all active speaker positions, press the ▲/▼ Buttons 14 until the on-screen cursor is next to BACK TO MASTER MENU and press the Set Button 16.

The delay settings may be changed at any time directly from the remote control by pressing the Delay Button 35. CENTER DELAY will appear in the Lower Display Line 30, but you may press the ▲/▼ Buttons 14 to select any of the speaker groups.

Press the Set Button 16 when the desired speaker group appears, and then press the ▲/▼ Buttons 14 again to enter the distance from the speaker to the listening position. Press the Set Button 16 again to enter the data. You may then press the ▲/▼ Buttons 14 to select another speaker group to repeat the procedure as needed, or wait five seconds for the system to return to normal operation.

Output Level Adjustment

Output level adjustment is a key part of the configuration of any surround sound product. It is particularly important for a digital receiver such as the AVR 230, as correct outputs ensure that you hear soundtracks with the proper directionality and intensity.

IMPORTANT NOTES:

- Listeners are often confused about the operation of the surround channels. While some assume that sound should always be coming from each speaker, most of the time there will be little or no sound in the surround channels. This is because they are only used when a movie director or sound mixer specifically places sound there to create ambience or a special effect, or to continue action from the front of the room to the rear. Once the output levels are properly set, it is normal for surround speakers to operate only occasionally. Artificially increasing the volume to the rear speakers may destroy the illusion of an enveloping sound field that duplicates the way you hear sound in a movie theater or concert hall.

- When the AVR 230 is configured for 6.1-channel operation using a single surround back speaker, the output level adjustments will still provide an adjustment for separate surround back left and surround back right positions even though your system has only one surround back speaker. This means that the Surround Back channel will seem to appear twice, and in 6.1 operation this is normal. The separate SBL/SBR adjustments for 6.1 operation are needed to optimize the balance between the two discrete channels within the AVR as they are mixed for output to a single speaker.

Before beginning the output level adjustment process, make certain that all speaker connections have been properly made. The system volume should be set to the level that you will use during a typical listening session. While the AVR 230 allows you to set output levels manually, we recommend that the EzSet system be used when the AVR is first installed, to establish the initial level settings.

Using EzSet

Harman Kardon's exclusive EzSet remote makes it possible to quickly and accurately set the AVR 230's output levels without the use of a sound pressure meter, although manual adjustment is also available. However, for the easiest setup, follow these steps while seated in the listening position that will be used most often:

1. Make certain that all speaker positions have been properly configured for their "large" or "small" settings (as outlined above) and turn off the OSD system if it is in use.

2. Adjust the volume so that it is at -15dB, as shown in the on-screen display or Lower Display Line 30.

3. Hold the remote in front of you at arm's length, being sure not to cover the EzSet Sensor Microphone 43 at the top of the remote.

4. Press and hold the SPL Selector Button 40 for three seconds. Release it when the Program/SPL Indicator 3 stops flashing and remains lit. Within five seconds, press the 5 Button 18 on the remote if your system is configured for 5.1 operation with standard speakers or the 7 Button 18 on the remote if your system is configured for 6.1/7.1 operation with one or two rear surround speakers. Once the correct channel configuration button has been pressed, the test noise will be heard from the front left speaker.

5. At this point, EzSet will take over, adjusting the output level of each channel so that when the process is complete all levels will be equal and at the set reference point. This process may take a few minutes, depending on the extent of adjustment required.

6. During the adjustment, you will see the location of the channel position being adjusted appear in the on-screen display (if connected) and in the Lower Display Line 30, alternating with a read-out of the output setting, relative to the reference volume level, and in the Speaker/Channel Input Indicators 28 where the letters for the channel being adjusted will flash to indicate the channel from which the test tone should be heard. As the adjustment proceeds, a few things will happen simultaneously:

   - The channel position being adjusted will flash in the Speaker/Channel Input Indicators 28. If the test noise is heard from a channel other than the one shown in the indicator, there is an error in the speaker connections. If this is the case, press the Test Button 9 TWICE to stop the adjustment. Then, turn the unit off and verify that all speakers are connected to the proper Outputs 9 10 11 1.
   - As the individual channels are set, the channel name and the adjustment offset will appear in the on-screen display (if connected) and the Lower Display Line 30. While the level is changing, the Program/SPL Indicator 3 will change colors to reflect the output level in relation to the reference. A red indication shows that the level is too high, while an amber indication shows that the level is too low. When the indicator is green, the level is correct, and the test noise will move to the next channel.
   - While adjustments are being made, the red LED under the AVR Selector 6 will flash. This is normal, and indicates that EzSet is operating.

7. After the test noise has circulated once through each channel, it will send the tone to each channel once again, to verify the settings.

8. After two complete circulations of the tone, the levels are set. The Program/SPL Indicator 3 will remain green at each channel. Upon completion of the second circulation, the Program/SPL Indicator 3 will flash green twice and then go out. The tone will stop and the AVR 230 will return to normal operation.

If you find that the output levels chosen by EzSet are either uncomfortably low or high, you may repeat the procedure. Return to Step 2 and adjust the master volume either slightly higher or lower to accommodate your particular room layout and your tastes. You may repeat this procedure as many times as necessary to achieve a desired result. In order to prevent possible damage to your hearing or your equipment, we emphasize that you should avoid setting the master volume above 0dB.

NOTE: The subwoofer output is not adjusted when the test tone is in use. To adjust the subwoofer output you must use an external source, following the instructions on page 29.

Manual Output Level Adjustment

Output levels may also be adjusted manually, either to set them to a specific level with an SPL meter, or to make fine-tuning adjustments to the levels obtained using the EzSet remote.

Figure 8

Manual output level adjustment is most easily done through the CHANNEL ADJUST menu (Figure 8). If you are already at the MASTER MENU, press the ▼ Button 14 until the on-screen ▶ cursor is next to the CHANNEL ADJUST line. If you are not at the MASTER MENU, press the OSD Button 22 to bring up the MASTER MENU (Figure 1), and then press the ▼ Button 14 until the on-screen ▶ cursor is next to the CHANNEL ADJUST line. Press the Set Button 16 to bring the CHANNEL ADJUST menu (Figure 8) to the screen.

correct channel from which the test noise should be heard will be shown in the lower third of the video screen and in the Lower Display Line 30. While the test noise is circulating, the proper channel position will also be indicated in the Speaker/Channel Input Indicators 28 by a blinking letter within the correct channel.

To adjust the output level, press the ▲/▼ Buttons 14 until the desired level is shown in the display or on-screen. Once the buttons are released, the test noise will begin to circulate again in five seconds.

When all channels have the same output level, press the Test Button 9 again to complete the process.

NOTE: Output level adjustment is not available for the VMAx or Surround Off modes.

Additional Input Adjustments

After one input has been adjusted for Surround mode, digital input (if any), speaker type, and output levels, go back to the INPUT SETUP line on the MASTER MENU (Figure 1) and enter the settings for each input that you will use. In most cases, only the digital input and surround mode will be different from one input to the next, while the speaker type, crossover frequency, Night mode and output level settings will usually be the same and may be quickly entered by entering the same data used for the original input.

When all settings and adjustments have been made, press the OSD Button 22 to return to normal operation of the AVR.

Once the settings outlined on the previous pages have been made, the AVR 230 is ready for operation. While there are some additional settings to be made, these are best done after you have had an opportunity to listen to a variety of sources and different kinds of program material. These advanced settings are described on pages 30 and 31 of this manual. In addition, any of the settings made in the initial configuration of the unit may be changed at any time. As you add new or different sources or speakers, or if you wish to change a setting to better reflect your listening taste, simply follow the instructions for changing the settings for that parameter as shown in this section.

Having completed the setup and configuration process for your AVR 230, you are about to experience the finest in music and home theater listening. Enjoy!

Basic Operation

Once you have completed the initial setup and configuration of the AVR 230, it is simple to operate and enjoy. The following instructions will help you maximize the enjoyment of your new receiver:

Turning the AVR 230 On or Off

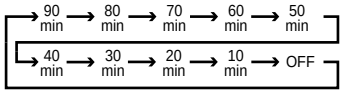
- When using the AVR 230 for the first time, you must first press the Main Power Switch 1 on the front panel to turn the unit on. This places the unit in a Standby mode, as indicated by the amber color of the Power Indicator 2. Once the unit is in Standby, you may begin a listening session by pressing the Standby/On Switch 3 on the front panel, or the Power On Button 4 or AVR Selector 6 on the remote. The Power Indicator 2 will turn blue. This will turn the unit on and return it to the input source that was last used. The unit may also be turned on from Standby by pressing any of the Input Selector Buttons 5 7 on the remote or the Input Source Selector Button 16 on the front panel.

NOTE: After pressing one of the Input Selector Buttons 5 7 to turn the unit on, press the AVR Selector 6 to set the remote control to the AVR 230 functions.

To turn the unit off at the end of a listening session, simply press the Standby/On Switch 3 on the front panel or the Power Off Button 1 on the remote. Power will be shut off to any equipment plugged into the rear-panel Switched AC Accessory Outlet 17 and the Power Indicator 2 will turn amber.

When the remote is used to turn the unit "off" it is actually placing the system in a Standby mode, as indicated by the amber color of the Power Indicator 2.

- To program the AVR 230 for automatic turn-off, press the Sleep Button 10 on the remote. Each press of the button will decrease the time before shut-down in the following sequence:



  The sleep time will be displayed in the Lower Display Line 30 and it will count down until the time has elapsed.

When the programmed sleep time has elapsed, the unit will automatically turn off. The front-panel display will dim to one-half brightness when the Sleep function is programmed. To cancel the Sleep function, press and hold the Sleep Button 10 until the information display returns to normal brightness; the Sleep indicator numbers will disappear and the words SLEEP OFF will appear in the Lower Display Line 30.

When you will be away from home for an extended period of time it is always a good idea to completely turn the unit off with the front-panel Main Power Switch 1.

NOTE: All preset memories are lost if the unit is left turned off by using the Main Power Switch 1 for more than four weeks.

Source Selection

- To select a source, press any of the Input Selector Buttons 5 7 41 on the remote.

- The input source may also be changed by pressing the front-panel Input Source Selector Button 16. Each press of the button will move the input selection through the list of available inputs.

- As the input is changed, the AVR 230 will automatically switch to the digital input (if selected), surround mode, output levels and night mode status as well as any speaker configuration or crossover settings established by using the *INDEPENDENT* Bass Management setting, that were entered during the configuration process for that source.

- The front-panel Video 4 Inputs 20 21, Optical 3 Digital Input 18 or the Coaxial 3 Digital Input 19 may be used to connect a device such as a video game or camcorder to your home entertainment system on a temporary basis.

- As the input source is changed, the new input name will appear momentarily as an on-screen display in the lower third of the video display. The input name will also appear in the Upper Display Line 29 in the on-screen display and in the front-panel Input Indicators 27.

- When an audio source is selected, the last video input used remains routed to the Video 1/Video 2 Video and S-Video Outputs 26 28 34 36 and Video and S-Video Monitor Outputs 21 31. This permits simultaneous viewing and listening to different sources.

6-Channel/8-Channel Direct Input

- There are two input choices available for use with sources such as a DVD-Audio or SACD player that are connected to the 6/8-Channel Direct Inputs 29. Select the appropriate input according to the way your system and source equipment are configured:

  ■ *6 CH DIRECT* should be used when the SBR and SBL inputs are NOT in use and the input source device has its own internal bass management system. This input passes the input from the source directly through to the volume control without any analog to digital conversion and it mutes the unused input jacks to prevent unwanted noise from interfering with system performance.

  ■ *8 CH DIRECT* should be used when an input is connected to all eight 8-Channel Direct Inputs 29 and when the input source device has its own internal bass management system. This input passes the input from the source directly through to the volume control without any analog to digital conversion and it mutes the unused input jacks to prevent unwanted noise from interfering with system performance.

Volume Control

- Adjust the volume to a comfortable level using the front-panel Volume Control 26 or remote Volume Up/Down Buttons 38.

- To temporarily silence all speaker outputs, press the Mute Button 42. This will interrupt the output to all speakers and the headphone jack, but it will not affect any recording or dubbing that may be in progress. When the system is muted, the word MUTE will flash in the Lower Display Line 30. Press the Mute Button 42 again to return to normal operation.

- You may adjust the bass and treble tone controls at any point during a listening session by simply turning the Bass Control 22 or Treble Control 24 until the desired setting is achieved. You may also totally remove the tone controls from the circuit so that the output is "flat" at any time by pressing the Tone Mode Button 5 and then pressing the ◀/▶ Button 10 so that *TONE OFF* appears in the on-screen display and the Lower Display Line 30.

- For private listening, plug the 1/4" stereo phone plug from a pair of stereo headphones into the front-panel Headphone Jack 4. When the headphone's plug is connected, the word HEADPHONE will scroll once across the Lower Display Line 30 and all speakers will be silenced. When the headphone plug is removed, the audio feed to the speakers will be restored.

Surround Mode Selection

One of the most important features of the AVR 230 is its ability to reproduce a full multichannel surround sound field from digital sources, analog matrix surround-encoded programs and standard stereo programs.

Selection of a surround mode is based on personal taste, as well as the type of program source material

being used. For example, motion pictures or TV programs bearing the logo of one of the major surround-encoding processes, such as Dolby Surround or DTS Stereo, may be played in either the Dolby Digital, Dolby Pro Logic II Cinema, DTS Neo:6 Cinema, or Logic 7 Cinema surround modes depending on the source material.

NOTE: Once a program has been encoded with matrix surround information, it retains the surround information as long as the program is broadcast in stereo. Thus, movies with surround sound may be decoded via any of the analog surround modes such as Pro Logic II Cinema, Logic 7 Cinema or DTS Neo:6 Cinema, when they are broadcast via conventional TV stations, cable, pay-TV and satellite transmission. In addition, a growing number of made-for-television programs, sports broadcasts, radio dramas and music CDs are also recorded in surround sound. You may view a list of these programs at the Dolby Laboratories Web site at www.dolby.com.

Even when a program is not listed as carrying intentional surround information, you may find that the Pro Logic II, Logic 7 Enhanced or DTS Neo:6, VMAx and the Hall or Theater modes often deliver enveloping surround presentations through the use of the natural information present in all stereo recordings.

Surround modes may be changed at any time by using either the front panel or remote control. To select a new surround mode from the front panel, first press the Surround Mode Group Selector Button **7** until a mode from the desired major surround mode group such as Dolby, DTS or Logic 7 is selected. Next, press the Surround Mode Selector Button **8** to choose the specific individual surround mode.

To select a surround mode using the remote, press the button for the major surround mode group that includes the mode you wish to choose from: Dolby **23**, DTS Surround **24**, DTS Neo:6 **29**, Logic 7 **25**, Stereo **28** or DSP Surround **11**. The first press of the button will show the current mode from that group. To cycle through the available modes in that group, press the button again until the desired mode appears in the Lower Display Line **30**, the on-screen display and in the Surround Mode Indicators **31**.

As the surround modes change, the choice will be displayed in the on-screen display, in the Lower Display Line **30** and in the Surround Mode Indicators **31**.

The Dolby Digital, Dolby Digital EX and DTS 5.1, DTS-ES Matrix and DTS-ES Discrete modes may only be selected when a digital input is in use. In addition, when a digital source is present, the AVR 230 will automatically select and switch to the correct mode, regardless of the mode that has been previously selected. For more information on selecting digital sources, see the Digital Audio Playback section below.

When the 6-channel/8-channel direct inputs are in use there is no surround processing, as these inputs take the analog output signals from an optional, external DVD-Audio or SACD player, or another source device and carry them straight through to the volume control without any further digital processing.

To listen to a program in traditional two-channel stereo, using the front left and front right speakers only (plus the subwoofer, if installed and configured), press the Stereo Button **28** until SURR OFF appears in the Lower Display Line **30**, or press the Surround Mode Group Selector **7** until the Stereo modes appear in the on-screen display and Lower Display Line **30**. Next, press the Surround Mode Select Button **8** until *SURROUND OFF* appears in the on-screen display and Lower Display Line **30**.

Digital Audio Playback

Digital audio is a major advancement over older analog surround processing systems such as Dolby Pro Logic. It delivers five discrete channels: left front, center, right front, left surround and right surround. Each channel reproduces full frequency range (20Hz to 20kHz) and offers dramatically improved dynamic range and significant improvements to signal-to-noise ratios. In addition, digital systems have the capability to deliver an additional channel that is specifically devoted to low-frequency information. This is the ".1" channel referred to when you see these systems described as "5.1," "6.1" or "7.1". The bass channel is separate from the other channels, but since it is intentionally bandwidth-limited, sound designers have given it that unique designation.

Dolby Digital

Dolby Digital is a standard part of DVD, and is available on specially encoded LD discs and satellite broadcasts and it is a part of the high-definition television (HDTV) system.

An optional, external RF demodulator is required to use the AVR 230 to listen to the Dolby Digital soundtracks available on laser discs. Connect the RF output of the LD player to the demodulator and then connect the digital output of the demodulator to the Optical or Coaxial Inputs **18** **19** **22**-**25** of the AVR 230. No demodulator is required for use with DVD players or DTS-encoded laser discs.

DTS

DTS is another digital audio system that is capable of delivering 5.1 or 6.1 discrete or matrix sound field reproduction. Although both DTS and Dolby Digital are digital, they use different methods of encoding the signals, and thus they require different decoding circuits to convert the digital signals back to analog.

DTS-encoded soundtracks are available on select DVD and LD discs, as well as on special audio-only DTS discs. You may use any LD or CD player equipped with a digital output to play DTS-encoded discs with the AVR 230. All that is required is to connect the player's output to either an Optical or Coaxial Input on the rear panel **22**-**25** or front panel **18** **19**.

In order to listen to DVDs encoded with DTS soundtracks, the DVD player must be compatible with the DTS signal as indicated by a DTS logo on the player's front panel. Early DVD players may not be able to play DTS-encoded DVDs. This does not indicate a problem with the AVR 230, as some players cannot pass the DTS signal through to the digital outputs. If you are in doubt as to the capability of your DVD player to handle DTS discs, consult the player's owner's manual.

NOTE: Some DVD players have a default setting that does not pass through the DTS signal. Before playing DVDs with a DTS soundtrack, make certain that the settings in your DVD player have been properly adjusted so that DTS audio is passed through. Consult the owner's manual for your DVD player for more information on making these settings.

Selecting a Digital Source

To utilize either digital mode, you must have properly connected a digital source to the AVR 230. Connect the digital outputs from DVD players, HDTV receivers, satellite systems or CD players to the Optical or Coaxial Inputs **18** **19** **22**-**25**. In order to provide a backup signal and a source for analog stereo recording, the analog outputs provided on digital source equipment should also be connected to their appropriate inputs on the AVR 230 rear panel (e.g., connect the analog stereo audio output from a DVD to the DVD Audio Inputs **32** on the rear panel when you connect the source's digital outputs).

If you have not already configured an input for a digital source using the on-screen menus as shown on page 17, first select the input using the remote or front-panel controls as outlined in this manual. Next, select the digital source by pressing the Digital Select Button **17** **13** and then using the ▲/▼ Buttons **14** on the remote or the ◀/▶ Selector Buttons **10** on the front panel to choose any of the

(Continued on p. 27)

Surround Mode Chart

MODE	FEATURES
Dolby Digital	Available only with digital input sources encoded with Dolby Digital data. It provides up to five separate main audio channels and a special dedicated Low-Frequency Effects channel.
Dolby Digital EX	Available when the receiver is configured for 6.1/7.1-channel operation, Dolby Digital EX is the latest version of Dolby Digital. When used with movies or other programs that have special encoding, Dolby Digital EX reproduces specially encoded soundtracks so that a full 6.1/7.1 sound field is available. When the receiver is set for 6.1/7.1 operation and a Dolby Digital signal is present, the EX mode is automatically selected. Even if specific EX encoding is not available to provide the additional channel, the special algorithms will derive a 6.1/7.1 output.
DTS 5.1	When the speaker configuration is set for 5.1-channel operation, the DTS 5.1 mode is available when DVD, audio-only music or laser discs encoded with DTS data are played. DTS 5.1 provides up to five separate main audio channels and a special dedicated low-frequency channel.
DTS-ES 6.1 Matrix DTS-ES 6.1 Discrete	When the speaker configuration is set for 6.1/7.1 operation, playback of a DTS-encoded program source will automatically trigger the selection of one of the two DTS-ES modes. Newer discs with special DTS-ES discrete encoding will be decoded to provide six discrete, full-bandwidth channels plus a separate low-frequency channel. All other DTS discs will be decoded using the DTS-ES Matrix mode, which creates a 6.1-channel sound field from the original 5.1-channel soundtrack.
Dolby Pro Logic II Movie Music Pro Logic	Dolby Pro Logic II is the latest version of Dolby Laboratory's benchmark surround technology that decodes full-range, discrete left, center right, right surround and left surround channels from either matrix surround-encoded programs and conventional stereo sources when an analog input is in use. The Dolby Pro Logic II Movie mode is optimized for movie soundtracks, while the Pro Logic II Music mode should be used with musical selections. The Pro Logic mode activates original Pro Logic processing for those who prefer that presentation.
Logic 7 Cinema Logic 7 Music Logic 7 Enhance	Exclusive to Harman Kardon for A/V receivers, Logic 7 is an advanced mode that extracts the maximum surround information from either surround-encoded programs or conventional stereo material. Depending on the number of speakers in use and the selection made in the ***SURROUND SELECT*** menu, the "5.1" versions of Logic 7 modes are available when the 5.1 option is chosen, while the "7.1" versions of Logic 7 produce a full sound field presentation, including back surround speakers when the "6.1/7.1" option is chosen. The Logic 7 C (or Cinema) mode should be used with any source that contains Dolby Surround or similar matrix encoding. Logic 7 C delivers increased center-channel intelligibility, and more accurate placement of sounds with fades and pans that are much smoother and more realistic than with other decoding techniques. The Logic 7 M or Music mode should be used with analog or PCM stereo sources. Logic 7 M enhances the listening experience by presenting a wider front soundstage and greater rear ambience. Both Logic 7 modes also direct low-frequency information to the subwoofer (if installed and configured) to deliver maximum bass impact. The Logic 7 E (or Enhance) mode, available only when the 5.1 option is chosen, is an extension of the Logic 7 mode that is primarily used with musical programs. Logic 7 adds additional bass enhancement that circulates low frequencies in the 40Hz to 120Hz range to the front and surround speakers to deliver a less localized soundstage that appears broader and wider than when the subwoofer is the sole source of bass energy.
DTS Neo:6 Cinema DTS Neo:6 Music	These two modes are available when any analog source is playing to create a six-channel surround presentation from conventional Matrix-encoded and traditional Stereo sources. Select the Cinema version of Neo:6 when a program with any type of analog Matrix surround encoding is present. Select the Music version of Neo:6 for optimal processing when a nonencoded, two-channel stereo program is being played.
Dolby 3 Stereo	Uses the information contained in a surround-encoded or two-channel stereo program to create center-channel information. In addition, the information that is normally sent to the rear-channel surround speakers is carefully mixed in with the front-left and front-right channels for increased realism. Use this mode when you have a center channel speaker but no surround speakers.
Theater	The Theater mode creates a sound field that resembles the acoustic feeling of a standard live-performance theater.
Hall 1, Hall 2	The two Hall modes create sound fields that resemble a small (Hall 1) and medium-sized (Hall 2) concert hall.
VMAx Near VMAx Far	When only the two front-channel loudspeakers are used, Harman's patented VMAx mode delivers a three-dimensional sound space with the illusion of "phantom speakers" at the center and surround positions. The VMAx N, or "Near Field," mode should be selected when your listening position is less than five feet from the speakers. The VMAx F, or "Far Field," mode should be selected when your listening position is greater than five feet from the speakers. The VMAx modes are also available using the Headphones Output **4**. When headphones are being used, the Far Field mode will appear to push the sound field away from your ears, reducing the "inside the head" sensation often experienced when using headphones.
5-Channel Stereo 7-Channel Stereo	This mode takes advantage of multiple speakers to place a stereo signal at both the front and back of a room. Depending on whether the AVR has been configured for either 5.1 or 6.1/7.1 operation, one of these modes, but not both, is available at any time. Ideal for playing music in situations such as a party, it places the same signal at the front-left and surround-left, and front-right and surround-right speakers. The center channel is fed a summed mono mix of the in-phase material of the left and right channels.
Surround Off (Stereo)	This mode turns off all surround processing and presents the pure left- and right-channel presentation of two-channel stereo programs.

OPTICAL or COAXIAL inputs, as they appear in the Upper Display Line 29 or on-screen display. When the digital source is playing, the AVR 230 will automatically detect which type of digital data stream is being decoded and display that information in the Upper Display Line 29.

Digital Bitstream Indications

When a digital source is playing, the AVR 230 senses the type of bitstream data that is present. Using this information, the correct surround mode will automatically be selected. For example, DTS bitstreams will cause the unit to switch to DTS decoding, and Dolby Digital bitstreams will enable Dolby Digital decoding. When the unit senses PCM data from CDs or LDs, you may select any of the standard surround modes, such as Dolby Pro Logic II or Logic 7. Since the range of available surround modes is dependent on the type of digital data that is present, the AVR 230 uses a variety of indicators and messages to let you know what type of signal is present. These messages will appear shortly after an input or surround mode is changed, and they will remain in the Lower Display Line 30 for about five seconds before that portion of the display returns to the normal surround mode indication.

Surround Mode Types

For Dolby Digital and DTS sources, a three digit indication will appear, showing the number of channels present in the data. An example of this type of display is 3/2/.1.

The first number indicates how many discrete front channel signals are present.

- A "3" tells you that separate front left, center and front right signals are available. This will be displayed for Dolby Digital 5.1 and DTS 5.1 programs.
- A "2" tells you that separate front left and right signals are available, but there is no discrete center channel signal. This will be displayed for Dolby Digital bitstreams that have stereo program material.
- A "1" tells you that there is only a mono channel available in the Dolby Digital bitstream.

The middle number indicates how many discrete surround channel signals are present.

- A "2" tells you that separate surround left and right signals are available. This will be displayed for Dolby Digital 5.1 and DTS 5.1 programs.
- A "1" tells you that there is only a single, surround-encoded surround channel. This will appear for Dolby Digital bitstreams that have matrix encoding.
- A "0" indicates that there is no surround channel information. This will be displayed for two-channel stereo programs.

The last number indicates whether there is a discrete low-frequency effects (LFE) channel. This is the ".1" in the common abbreviation of "5.1" sound and is a special channel that contains only bass frequencies.

- A "1" tells you that an LFE channel is present. This will be displayed for Dolby Digital 5.1 and DTS 5.1 programs, as available.
- A "0" indicates that there is no LFE channel information available. However, even when there is no dedicated LFE channel, low-frequency sound will be present at the subwoofer output when the speaker configuration is set to show the presence of subwoofer.

When Dolby Digital 3/2/.1 or DTS 3/2/.1 signals are being played, the AVR will automatically switch the proper surround mode, and no other processing may be selected. When a Dolby Digital signal with a 3/1/0 or 2/0/0 signal is detected you may select any of the Dolby surround modes.

It is always a good idea to check the readout for the channel data to make certain that it matches the audio logo information shown on the back of a DVD package. In some cases you will see indication for "2/0/0" even when the disc contains a full 5.1, or 3/2/.1 signal. When this happens, check the audio output settings for your DVD player or the audio menu selections for the specific disc being played to make certain that the player is sending the correct signal to the AVR.

PCM Playback Indications

PCM is the abbreviation for Pulse Code Modulation, which is the type of digital signal used for standard CD playback and other non-Dolby Digital and non-DTS digital sources such as Mini-Disc. When a PCM signal is detected, the Lower Display Line 30 will briefly show a message with the letters PCM, in addition to a readout of the sampling frequency of the digital signal.

In most cases this will be *48kHz*, though in the case of specially mastered, high-resolution audio discs you will see a *96kHz* indication.

Again, remember that some DVD discs are recorded with both "5.1" and "2.0" versions of the same soundtrack. When playing a DVD, always be certain to check the type of material on the disc. Most discs show this information in the form of a listing or icon on the back of the disc jacket. When a disc does offer multiple soundtrack choices you may have to make some adjustments to your DVD player (usually with the "Audio Select" button or in a menu screen on the disc) to send a full 5.1 feed to the AVR 230. It is also possible for the type of signal feed to change during the course of a DVD playback. In some cases the previews of special material will only be recorded in 2.0 audio, while the main feature is available in 5.1 audio. The AVR 230 will automatically sense changes to the bitstream and channel count and reflect them in these indicators.

Speaker/Channel Indicators

In addition to the bitstream indicators, the AVR 230 features a set of unique channel-input indicators that tell you how many channels of digital information are being received and/or whether the digital signal is interrupted. (See Figure 9.)

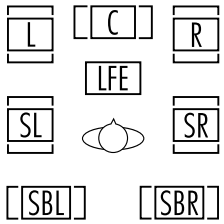


Figure 9

These indicators are the L/C/R/LFE/SL/SR/SBL/SBR letters that are inside the center boxes of the Speaker/Channel Input Indicators 28 on the front panel. When a standard analog signal is in use, only the "L" and "R" indicators will light, as analog signals have only left and right channels.

Digital signals, however, may have two, five, six or seven channels, depending on the program material, the method of transmission and the way in which it was encoded. When a digital signal is playing, the letters in these indicators will light in response to the specific signal being received. It is important to note that although Dolby Digital, for example, is referred to as a "5.1" system, not all Dolby Digital DVDs or programs are encoded for 5.1. Thus, it is sometimes normal for a DVD with a Dolby Digital soundtrack to trigger only the "L" and "R" indicators.

NOTE: Many DVD discs are recorded with both "5.1" and "2.0" versions of the same soundtrack. When playing a DVD, always be certain to check the type of material on the disc. Most discs show this information in the form of a listing or icon on the back of the disc jacket. When a disc does offer multiple soundtrack choices, you may have to make some adjustments to your DVD player (usually with the "Audio Select" button or in a menu screen on the disc) to send a full 5.1 feed to the AVR 230. It is also possible for the type of signal feed to change during the course of a DVD playback. In some cases, the previews of special material will only be recorded in 2.0 audio, while the main feature is available in 5.1 audio. The AVR 230 will automatically sense changes to the bitstream and channel count and reflect them in these indicators.

The letters used by the Speaker/Channel Input Indicators 28 also flash to indicate when a bitstream

has been interrupted. This will happen when a digital input source is selected before the playback starts, or when a digital source such as a DVD is paused. The flashing indicators remind you that the playback has stopped due to the absence of a digital signal and not through any fault of the AVR 230. This is normal, and the digital playback will resume once the playback is started again.

Night Mode

A special feature of Dolby Digital is the Night mode, which enables specially encoded Dolby Digital input sources to be played back with full digital intelligibility while reducing the minimum peak level by 1/4 to 1/3. This prevents abruptly loud transitions from disturbing others, without reducing the impact of the digital source. The Night mode is available only when Dolby Digital signals with special data are being played.

The Night mode may be engaged when a Dolby Digital DVD is playing by pressing the Night Mode Button 12 on the remote. Next, press the ▲/▼ Buttons 14 to select either the middle range or full compression versions of the Night mode. To turn the Night mode off, press the ▲/▼ Buttons 14 until the message in the lower third of the video display and in the Lower Display Line 30 reads D-RANGE OFF.

The Night mode may also be selected to always be on at either level of compression using the options in the DOLBY menu. See page 18 for information on using the menus to set this option.

IMPORTANT NOTES ON DIGITAL PLAYBACK:

- When the digital playback source is stopped, or in a pause, fast-forward or chapter-search mode, the digital audio data will momentarily stop, and the channel position letters inside the Speaker/Channel Input Indicators 28 will flash. This is normal and does not indicate a problem with either the AVR 230 or the source machine. The AVR 230 will return to digital playback as soon as the data is available and when the machine is in a standard play mode.
- Although the AVR 230 will decode virtually all current DVD movies, CDs and HDTV sources, it is possible that some future digital sources may not be compatible with the AVR 230.
- Not all digitally encoded programs contain full 5.1- or 6.1-channel audio. Consult the program guide that accompanies the DVD or laser disc to determine which type of audio has been recorded on the disc. The AVR 230 will automatically sense the type of digital surround encoding used and adjust to accommodate it.
- When some digital sources are playing, you may not be able to select some of the analog surround modes such as Dolby Pro Logic II, Dolby 3, Stereo, Hall, Theater or Logic 7.
- When a Dolby Digital or DTS source is playing, it is not possible to make an analog recording using the Tape Outputs 3 and Video 1 or Video 2 Audio Outputs 34 36. However, the digital signals will be passed through to the Digital Audio Outputs 19 20.

PCM Audio Playback

PCM (Pulse Code Modulation) is the noncompressed digital audio system used for compact discs and laser discs. The digital circuits in the AVR 230 are capable of high-quality digital-to-analog decoding, and they may be connected directly to the digital audio output of your CD or LD player.

Connections may be made to either the rear-panel Optical or Coaxial Inputs 22 25 or the front-panel Digital Inputs 18 19.

To listen to a PCM digital source, first select the input for the desired source (e.g., CD). Next press the Digital Select Button 13 17 and then use the ▲/▼ Buttons 14 on the remote, or the ◀/▶ Selector Buttons 10 on the front panel, until the desired choice appears in the Upper Display Line 29.

During PCM playback, you may select any Surround mode except Dolby Digital or DTS.

Tuner Operation

The AVR 230's tuner is capable of tuning AM, FM and FM Stereo broadcast stations. Stations may be tuned manually, or they may be stored as favorite station presets and recalled from a 30-position memory.

Station Selection

1. Press the AM/FM Tuner Select Button 7 on the remote to select the tuner as an input. The tuner may be selected from the front panel by either pressing the Input Source Selector 16 until the tuner is active or by pressing the Tuner Band Selector 11.
2. Press the AM/FM Tuner Select Button 7 or Tuner Band Selector 11 again to switch between AM and FM so that the desired frequency band is selected.
3. Press the Tuner Mode Button 17 19 to select manual or automatic tuning.

   When the button is pressed so that *AUTO* appears in the Lower Display Line 30 each press of the Tuning Selectors 9 21 will put the tuner in a scan mode that seeks the next higher or lower frequency station with acceptable signal strength. An *AUTO ST TUNED* indication will momentarily appear when the station stops at a stereo FM station, and an *AUTO TUNED* indication will momentarily appear when an AM or monaural FM station is tuned. Press the Tuning buttons again to scan to the next receivable station.

   When the button is pressed so that *MANUAL* appears in the Lower Display Line 30 each tap of the Selector will increased or decrease the frequency by one increment. When the tuner receives a strong enough signal for adequate reception, *MANUAL TUNED* will appear in the Lower Display Line 30.
4. Stations may also be tuned directly in either the automatic or manual mode. To enter a station's frequency directly, first select the AM or FM band as desired be pressing the AM/FM Tuner Select Button 7. Next, press the Direct Button 20. Within five seconds of seeing the *DIRECT IN* scroll in the Upper Display Line 29, enter the station frequency by pressing the Numeric Keys 18. If you press an incorrect button while entering a direct frequency, press the Clear Button 33 to start over.

NOTE: When the FM reception of a station is weak, audio quality will be increased by switching to Mono mode by pressing the Tuner Mode Button 17 19 so that *MANUAL* appears momentarily in the Lower Display Line 30 goes out. This will also activate manual tuning mode.

Preset Tuning

Using the remote, up to 30 stations may be stored in the AVR 230's memory for easy recall using the front panel controls or the remote.

To enter a station into the memory, first tune the station using the steps outlined above. Then:

1. Press the Memory Button 34 on the remote. Two underscore lines will appear at the far right side of the Upper Display Line 29.
2. Within five seconds, press the Numeric Keys 18 corresponding to the location where you wish to store this station's frequency. Once entered, the preset number will appear in the Upper Display Line 29.
3. Repeat the process after tuning any additional stations to be preset.

Recalling Preset Stations

- To manually select a station previously entered in the preset memory, press the Numeric Keys 18 that correspond to the desired station's memory location.

- To manually tune through the list of stored preset stations one by one, press the Preset Stations Selector Buttons 14 on the front panel or remote.

Tape Recording

In normal operation, the audio or video source selected for listening through the AVR 230 is sent to the record outputs. This means that any program you are watching or listening to may be recorded simply by placing machines connected to the Tape Outputs 3 or Video 1/Video 2 Audio and Video and S-Video Outputs 26 28 in the Record mode.

When a digital audio recorder is connected to the Digital Audio Outputs 19 20, you are able to record the digital signal using a CD-R, MiniDisc or other digital recording system.

NOTES:

- The digital outputs are active only when a digital signal is present, and they do not convert an analog input to a digital signal, or change the format of the digital signal. In addition, the digital recorder must be compatible with the output signal. For example, the PCM digital input from a CD player may be recorded on a CD-R or MiniDisc, but Dolby Digital or DTS signals may not.
- Please make certain that you are aware of any copyright restrictions on any material you copy. Unauthorized duplication of copyrighted materials is prohibited by federal law.

Output Level Trim Adjustment

Normal output level adjustment for the AVR 230 is established using the test tone, as outlined on pages 21–23. In some cases, however, it may be desirable to adjust the output levels using program material such as a test disc, or a selection you are familiar with. Additionally, the output level for the subwoofer can only be adjusted using this procedure.

To adjust the output levels using program material, first set the reference volume for the front left and front right channels using the Volume Control 26 .

If you are using a disc with test signals or an external signal generator as the source from which to trim the output levels, you may use the EzSet feature of the remote to guide you to the correct SPL level. To use the remote for this purpose, press and quickly release the SPL Selector Button to activate the sensor. While the test tone is circulating, the Program/SPL Indicator 3 will change color to indicate the level. Adjust the level using the ▲/▼ Buttons 14 until the LED lights green for all channels. When it is red the level is too high; when it is amber the level is too low. Press the SPL Selector Button to turn the sensor and indicator off.

Once the reference level has been set, press the Channel Select Button 13 and FRONT L LEV will appear in the Lower Display Line 30. To change the level, first press the Set Button 16, and then use the ▲/▼ Buttons 14 to raise or lower the level. DO NOT use the volume control, as this will alter the reference setting.

Once the change has been made, press the Set Button 16 and then press the ▲/▼ Buttons 14 to select the next output channel location that you wish to adjust. To adjust the subwoofer level, press the ▲/▼ Buttons 14 until WOOFER LEV appears in the Lower Display Line 30.

Repeat the procedure as needed until all channels requiring adjustment have been set. When all adjustments have been made and no further adjustments are made for five seconds, the AVR 230 will return to normal operation.

The channel output for any input may also be adjusted using the full-OSD on-screen menu system. First, set the volume to a comfortable listening level using the Volume Control 26 . Then, press the OSD Button 22 to bring up the MASTER MENU (Figure 1). Press the ▼ Button 14 until the on-screen ▶ cursor is next to the CHANNEL ADJUST line. Press the Set Button 16 to activate the CHANNEL ADJUST menu.

Once the menu appears on your video screen, first use the ▲/▼ Buttons 14 to move the on-screen ▶ cursor so that it is next to the *TEST TONE* line. Press the ◀/▶

The AVR 230 is equipped with a number of advanced features that add extra flexibility to the unit's operation. While it is not necessary to use these features to operate the unit, they provide additional options that you may wish to use.

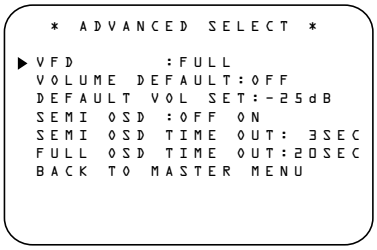


Figure 10

Display Brightness

The AVR 230's front-panel display is set at a default brightness level that is sufficient for viewing in a normally lit room. However, in some home theater installations, you may wish to occasionally lower the brightness of the display, or turn it off completely. To change the display brightness setting for a specific listening session, you will need to make an adjustment in the ADVANCED SELECT menu. To start the adjustment, press the OSD Button 22 to bring the MASTER MENU to the screen. Press the ▼ Button 14 until the on-screen ▶ cursor is next to the ADVANCED line. Press the Set Button 16 to enter the ADVANCED SELECT menu (Figure 10).

To change the brightness setting, at the ADVANCED SELECT menu, make certain that the on-screen ▶ cursor is next to the VFD line, and press the ▶ Button 15 until the desired brightness level is shown in the video display. When FULL is highlighted, the display is at normal brightness. When HALF is shown, the display is at half the normal brightness level. When OFF is shown, all of the front-panel indicators will go dark. However, the Power Indicator 3 will always remain lit to remind you that the unit is turned on.

Once the desired brightness level is selected, it will remain in effect until it is changed again or until the unit is turned off.

If you wish to make other adjustments, press the ▲/▼ Buttons 14 until the on-screen ▶ cursor is next to the desired setting or the BACK TO MASTER MENU line and press the Set Button 16. If you have no other adjustments to make, press the OSD Button 22 to exit the menu system.

Turn-On Volume Level

As is the case with most audio/video receivers, when the AVR 230 is turned on, it will always return to the volume setting in effect when the unit was turned off. However, you may prefer to always have the AVR 230 turn on at a specific setting, regardless of what was last in use when the unit was turned off. To change the default condition so that the same volume level is always used at turn-on, you will need to make an adjustment in the ADVANCED SELECT menu. To start the adjustment, press the OSD Button 22 to bring the MASTER MENU (Figure 1) to the screen. Press the ▼ Button 14, until the on-screen ▶ cursor is next to the ADVANCED line. Press the Set Button 16 to enter the ADVANCED SELECT menu (Figure 10).

At the ADVANCED SELECT menu make certain that the on-screen ▶ cursor is next to the VOLUME DEFAULT line by pressing the ▲/▼ Buttons 14 as needed. Next, press the ▶ Button 15 so that the word ON is shown in the video display. Next, press the ▼ Button 14 once so that the on-screen ▶ cursor is next to the DEFAULT VOL SET line. To set the desired turn-on volume, press the ◀/▶ Buttons 15 until the desired volume level is shown on the DEFAULT VOL SET line. This setting may NOT be made with the regular volume controls.

NOTE: Since the setting for the turn-on volume cannot be heard while the setting is being made, you may wish to determine the setting before making the adjustment. To do this, listen to any source and adjust the volume to the desired level using the regular Volume Controls 26 38. When the desired volume level to be used at turn-on is reached, make a note of the setting as it appears in the lower third of the video screen or in the Lower Display Line 30. (A typical volume level will appear as a negative number such as –25dB.) When making the adjustment, use the ◀/▶ Buttons 15 to enter this setting.

Unlike some of the other adjustments in this menu, the turn-on volume default will remain in effect until it is changed or turned off in this menu, even when the unit is turned off.

If you wish to make other adjustments, press the ▲/▼ Buttons 14 until the on-screen ▶ cursor is next to the desired setting or the BACK TO MASTER MENU line and press the Set Button 16. If you have no other adjustments to make, press the OSD Button 22 to exit the menu system.

Semi-OSD Settings

The semi-OSD system places one-line messages at the lower third of the video display screen whenever the Volume, Input Source, Surround mode, tuner frequency or any of the configuration settings are changed. The semi-OSD system is helpful in that it provides feedback on any control changes or remote commands using the video display when it is difficult to view the front-panel displays. However, you may occasionally prefer to turn these displays off for a particular listening session. You may also want to adjust the length of time the displays remain on the screen. Both of those options are possible with the AVR 230.

To turn off the semi-OSD system, you'll need to make an adjustment in the ADVANCED SELECT menu (Figure 10). To start the adjustment, press the OSD Button 22 to bring the MASTER MENU to the screen. Press the ▼ Button 14, until the on-screen ▶ cursor is next to the ADVANCED line. Press the Set Button 16 to enter the ADVANCED SELECT menu.

At the ADVANCED SELECT menu, make certain that the on-screen ▶ cursor is next to the SEMI OSD DEFAULT line by pressing the ▲/▼ Buttons 14 as needed. Next, press the ▶ Button 15 so that the word OFF is shown in the video display.

This setting is temporary and will remain active only until it is changed or until the AVR 230 is turned off. Once the unit is turned off, the semi-OSD displays will remain activated, even if they were switched off for the previous listening session.

To change the length of time that the semi-OSD displays remain on the screen, go to the ADVANCED SELECT menu as outlined earlier, and press the ▲/▼ Buttons 14 as needed, until the on-screen ▶ cursor is next to the SEMI OSD TIME OUT line. Next, press the ◀/▶ Buttons 15 until the desired time in seconds is displayed. Unlike most of the other options in this menu, this is a permanent setting change, and the time-out entry will remain in effect until it is changed, even when the unit is turned off.

If you wish to make other adjustments, press the ▲/▼ Buttons 14 until the on-screen ▶ cursor is next to the desired setting or the BACK TO MASTER MENU line and press the Set Button 16. If you have no other adjustments to make, press the OSD Button 22 to exit the menu system.

Full-OSD Time-Out Adjustment

The FULL OSD menu system is used to simplify the setup and adjustment of the AVR 230, using a series of on-screen menus. The factory default setting for these menus leaves them on the screen for 20 seconds after a period of inactivity before they disappear from the screen (Time-Out). Time-Out is a safety measure to prevent image retention of the menu text in your monitor or projector, which might happen if it were left on indefinitely. However, some viewers may prefer a slightly longer or shorter period before the Time-Out display.

To change the full-OSD Time-Out, you will need to make an adjustment in the ADVANCED SELECT menu (Figure 10). To start the adjustment, press the OSD Button 22 to bring the MASTER MENU to the screen. Press the ▼ Button 14, until the on-screen ▶ cursor is next to the ADVANCED line. Press the Set Button 16 to enter the ADVANCED menu (Figure 10).

At the ADVANCED SELECT menu (Figure 10) make certain that the on-screen ▶ cursor is next to the FULL OSD TIME OUT line by pressing the ▲/▼ Buttons 14 as needed. Next, press the ◀/▶ Buttons 15 until the desired time is displayed in seconds. Unlike most of the other options in this menu, this is a permanent setting change, and the Time-Out entry will remain in effect until it is changed, even if the unit is turned off.

If you wish to make other adjustments, press the ▲/▼ Buttons 14 until the on-screen ▶ cursor is next to the desired setting or the RETURN TO MASTER MENU line and press the Set Button 16. If you have no other adjustments to make, press the OSD Button 22 to exit the menu system.

The AVR 230 is equipped with a powerful remote control that will control not only the receiver's functions, but also most popular brands of audio and video equipment, including CD players, cassette decks, TV sets, cable boxes, VCRs, satellite receivers and other home theater equipment. Once the AVR 230's remote is programmed with the codes for the products you own, it is possible to eliminate most other remotes and replace them with the convenience of a single, universal remote control.

Programming the Remote

The AVR 230 remote is factory-programmed for all AVR functions, as well as those of most Harman Kardon CD changers, DVD players, CD players and cassette decks. In addition, by following one of the methods below, you may program the remote to operate a wide range of devices from other manufacturers.

Direct Code Entry

This method is the easiest way to program your remote to work with different products.

1. Use the tables in the following pages to determine the three-digit code or codes that match both the product type (e.g., VCR, TV) and the specific brand name. If there is more than one number for a brand, make note of the different choices.
2. Turn on the unit you wish to program into the AVR 230 remote.
3. Press and hold both the Input Selector ❺ for the product you wish to control (e.g., VCR, TV) and the Mute Button ㊷ at the same time. When the red light under the Input Selector ❺ stays lit and the Program/SPL Indicator ❸ turns amber and begins flashing, release the buttons. It is important that you begin the next step within 20 seconds.
4. Point the AVR 230's remote toward the unit to be programmed, and enter the first three-digit code using the Numeric Keys ⑱. If the unit turns off, the correct code has been entered. Press the Input Selector ❺ again, and note that the red light will flash three times before going dark to confirm the entry.
5. If the device to be programmed in does NOT turn off, continue to enter three-digit codes until the equipment turns off. At this point, the correct code has been entered. Press the Input Selector ❺ again and note that the red light under the Input Selector ❺ will flash three times before going dark to confirm the entry.
6. Try all of the functions on the remote to make certain that the product operates properly. Keep in mind that many manufacturers use a number of different combinations of codes, so it is a good idea to make certain that not only the power control, but the volume, channel and transport controls work as they should. If functions do not work properly, you may need to use a different remote code.
7. If a code cannot be entered to turn the unit off, if the code for your product does not appear in the tables in this manual, or if not all functions operate properly, try programming the remote with the Auto Search Method.

Auto Search Method

If the unit you wish to include in the AVR 230's remote is not listed in the code tables in this manual or if the code does not seem to operate properly, you may wish to program the correct code using the Auto Search method that follows:

1. Turn on the unit that you wish to include in the AVR 230 remote.
2. Press the Input Selector ❺ for the type of product to be entered (e.g., VCR, TV) and the Mute Button ㊷ at the same time. Hold both buttons until the red light under the Input Selector ❺ stays lit and the Program/SPL Indicator ❸ turns amber and begins flashing. The next step must take place while the red light is on, and it must begin within 20 seconds after the light appears.
3. Point the AVR 230 remote toward the unit to be programmed, and press either the ▲ or ▼ Button ⑭. Each press will send out a series of codes from the remote's built-in database. When the unit being programmed turns off, release the ▲/▼ Button ⑭, as that is your indication that the correct code is in use.
4. Press the Input Selector ❺; the red light under the Input Selector will flash three times before going dark to confirm the entry.
5. Try all of the functions on the remote to make certain that the product operates. Keep in mind that many manufacturers use a number of different combinations of codes, and it is a good idea to make certain that not only the power control works, but also the volume, channel and transport controls, as appropriate. If all functions do not work properly, you may need to Auto-Search for a different code, or enter a code via the Direct Code Entry method.

Code Readout

When the code has been entered using the Auto Search method, it is always a good idea to find out the exact code so that it may be easily reentered if necessary. You may also read the codes to verify which device has been programmed to a specific Control Selector button.

1. Press and hold both the Input Selector ❺ for the device you wish to find the code for and the Mute Button ㊷ at the same time. The Program/SPL Indicator ❸ will turn amber and begin flashing, and the red light under the Input Selector ❺ will stay lit. Release the buttons and begin the next step within 20 seconds.
2. Press the Set Button ⑯. The Program/SPL Indicator ❸ will then blink green in a sequence that corresponds to the three-digit code, with a one-second pause between each digit. Count the number of blinks between pauses to determine the digit of the code. One blink is the number 1, two blinks is the number 2, and so forth. Ten blinks are used to indicate a "0."

Example: One blink, followed by a one-second pause, followed by six blinks, followed by a one-second pause, followed by ten blinks indicates that the code has been set to 160.

For future reference, enter the setup codes for the equipment in your system here:

DVD _____ CD _____

VID1/VCR _____ VID2/TV _____

VID3/CBL _____ VID3/SAT _____

VID4 _____ TAPE_____

Macro Programming

Macros enable you to easily repeat frequently used combinations of commands with the press of a single button on the AVR 230's remote control. Once programmed, a macro will send out up to 19 different remote codes in a predetermined sequential order enabling you to automate the process of turning on your system, changing devices, or other common tasks. The AVR 230's remote can store up to five separate macro command sequences: one that is associated with the Power On Button ❶ and four more that are accessed by pressing the Macro Buttons ㉚.

1. Press the Mute Button ㊷ and the Macro Button ㉚ to be programmed or the Power On Button ❶ at the same time. An Input Selector ❺❻ will light red, and the Program/SPL Indicator ❸ will flash amber.
2. Enter the steps for the macro sequence by pressing the button for the actual command step. Although the macro may contain up to 19 steps, each button press, including those used to change devices, counts as a step. The Program/SPL

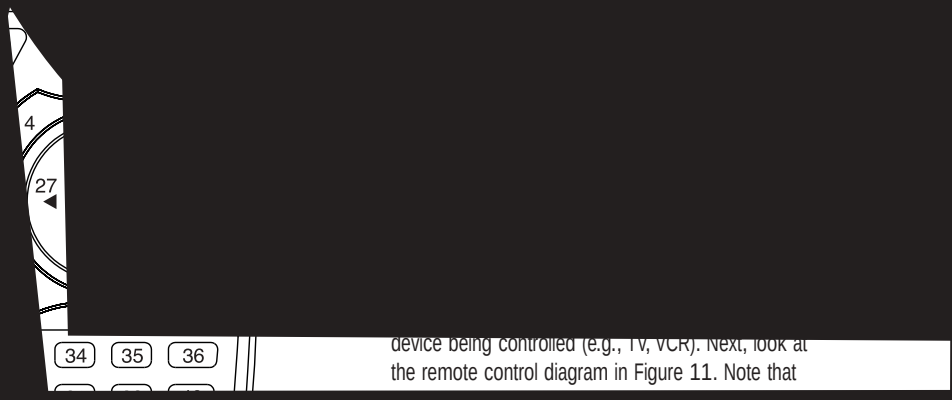


Figure 11

device being controlled (e.g., TV, VCR). Next, look at the remote control diagram in Figure 11. Note that

buttons.

- When a button is pressed on the AVR 230 remote, the red light under the Input Selector 5 6 for the product being operated should flash briefly. If the Device Control Selector flashes for some but not all buttons for a particular product, it does NOT indicate a problem with the remote but rather that no function is programmed for the button being pushed.

Volume Punch-Through

The AVR 230's remote may be programmed to operate the Volume Control 38 and Mute 42 functions of either the TV or the AVR 230 in conjunction with any of the devices controlled by the remote. For example, since the AVR 230 will likely be used as the sound system for TV viewing, you may wish to have the AVR 230's volume activated, although the remote is set to run the TV. Either the AVR 230 or TV volume control may be associated with any of the remote's devices. To program the remote for Volume Punch-Through, follow these steps:

1. Press the Input Selector 5 for the unit you wish to have associated with the volume control and the Mute Button 42 at the same time until the red light appears under the Input Selector 5; the Program/SPL Indicator 3 will flash amber.
2. Press the Volume Up Button 38; the Program/SPL Indicator 3 will stop flashing and stay amber.
3. Press either the AVR Selector 6 or the Input Selector 5, depending on which system's volume control you wish to have attached for the punch-through mode. The Program/SPL Indicator 3 will blink green three times and then go out to confirm the data entry.

   Example: To have the AVR 230's volume control activated even though the remote is set to control the TV, first press the Video/TV Input Selector 5 and the Mute Button 42 at the same time. Next, press the Volume Up Button 38 , followed by the AVR Selector 6.

NOTE: Should you wish to return the remote to the original configuration after entering a Volume Punch-Through, you will need to repeat the steps shown above. However, press the same Input Selector in Steps 1 and 3.

Channel Control Punch-Through

The AVR 230's remote may be programmed to operate so that the channel control function for either the TV, cable or satellite receiver used in your system may be used in conjunction with one of the other devices controlled by the remote. For example, while using and controlling the VCR, you may wish to change channels on a cable box or satellite receiver without having to change the device selected by the AVR 230 or the remote. To program the remote for Channel Control Punch-Through, follow these steps:

1. Press the Input Selector Button 5 6 for the device you wish to have the channel control associated with and the Mute Button 42 at the same time until the red light appears under the Input Selector 5 6 and the Program/SPL Indicator 3 flashes amber.
2. Press the Volume Down Button 38. The Program/SPL Indicator 3 will stop flashing and stay amber.
3. Press and release the Input Selector Button 5 for the device that will be used to change the channels. The Program/SPL Indicator 3 will blink green three times and then go out to confirm the data entry.

   Example: To control the channels using your cable box or satellite receiver while the remote is set to control the VCR, first press the VID 1/VCR Input Selector Button 5 and the Mute Button 42 at the same time. Next, release them and press the Volume Down Button 38, followed by the VID 2/TV Input Selector Button 5.

NOTE: To remove the Channel Control Punch-Through and return the remote to its original configuration, repeat the steps shown in the example above. However, press the same Input Selector in Steps 1 and 3.

Transport Control Punch-Through

The AVR 230's remote may be programmed to operate so that the Transport Control Functions 27 (Play, Stop, Fast Forward, Rewind, Pause and Record) for a VCR, DVD or CD will operate in conjunction with one of the other devices controlled by the remote. For example, while using and controlling the TV, you may wish to start or stop your VCR or DVD without having to change the device selected by the AVR 230 or the remote. To program the remote for Transport Control Punch-Through, follow these steps:

1. Press the Input Selector 5 6 for the device you wish to have the channel control associated with and the Mute Button 42 at the same time until the red light appears under the Input Selector 5 and the Program/SPL Indicator 3 flashes amber.
2. Press the Play Button 27. The Program/SPL Indicator 3 will stop flashing and stay amber.
3. Press and release the Input Selector Button 5 for the device that will be used to change the channels. The Program/SPL Indicator 3 will blink green three times and then go out to confirm the data entry.

   Example: To control the transport of a DVD player while the remote is set to control the TV, first press the VID 2/TV Input Selector Button 5 and the Mute Button 42 at the same time. Next, release them and press the Play Button 27, followed by the DVD Input Selector Button 5.

NOTES:

- To remove the Channel Control Punch-Through and return the remote to its original configuration, repeat the steps in the example above. However, press the same Input Selector in Steps 1 and 3.
- Before programming the remote for Volume, Channel or Transport Punch-Through, make certain that any programming needed for the specific TV, CD, DVD, cable or satellite receivers has been completed.
- The AVR 230 remote is preprogrammed at the factory so that the Transport Control Functions 27 operate the DVD player whenever the AVR device is selected.

Resetting the Remote Memory

As you add components to your home theater system, occasionally you may wish to totally reprogram the remote control without the confusion of any commands, macros or "Punch-Through" programming that you may have done. To do this, it is possible to reset the remote to the original factory defaults and command codes by following these steps. However, once the remote is reset, all commands or codes that you have entered will be erased and will need to be reentered:

1. Press any of the Input Selector Buttons (5) and the "O" Button (18) at the same time until the Program/SPL Indicator (3) begins to flash amber.
2. Press the "3" Button (18) three times.
3. The red LED under the Input Selector (5) will go out and the Program/SPL Indicator (3) will stop flashing and turn green.
4. The Program/SPL Indicator (3) will remain green until the remote is reset. Note that this may take a while, depending on how many commands are in the memory that need to be erased.
5. When the Program/SPL Indicator (3) goes out, the remote has been reset to the factory settings.

FUNCTION LIST

No.	Button Name	AVR Function	DVD	CD/CD-R	Tape	VCR (VID1)	TV (VID2)	CBL (VID3)	SAT (VID3)
1	Power On	Power On	Power On	Power On	Power On	Power On	Power On	Power On	Power On
2	Power Off	Power Off	Power Off	Power Off	Power Off	Power Off	Power Off	Power Off	Power Off
3	Mute	Mute	Mute	Mute	Mute	Mute	Mute	Mute	Mute
4	AVR	AVR Select							
5	DVD	DVD Input Select	DVD Select						
6	CD	CD Input Select		CD Select					
7	Tape	Tape Input Select			Tape Select				
8	VID 1	Video 1 Select				VCR Select			
9	VID 2	Video 2 Select					TV Select		
10	VID 3	Video 3 Select						VID3 Select	VID3 Select
11	VID 4	Video 4 Select							
12	Dim	Dim							
13	AM/FM	Tuner Select							
14	6/8 Ch. Select	6/8 Ch. Input Select							
15	SPL	EzSet/SPL							
16	Sleep	Sleep				Channel +	Channel +	Channel +	Channel +
17	Test	Test Tone		Input Select					
18	T/V		TV/DVD	CDP Select		TV/VCR	TV/VCR	TV/Cable	TV/Sat
19	Volume Up	Volume Up		Input Level Up		Volume Up	Volume Up	Volume Up	Volume Up
20	Surround Select	Surround Mode Select		CDR Select		Channel –	Channel –	Channel –	Channel –
21	Night	Night Mode Select	Subtitle On/Off	CDR Select					
22	Spare								
23	Volume Down	Volume Down		Input Level Down			Volume Down	Volume Down	Volume Down
24	Channel/Guide	Channel Trim	Title					Info/Guide	Info/Guide
25	▲	Move/Adjust Up	Up			Up	Up	Up	Up
26	Speaker/Menu	Speaker Adjust	Menu	Intro Scan		Menu	Menu	Menu	Menu
27	◄	Move/Adjust Left	Left			Left	Left	Left	Left
28	Set	Set	Enter			Enter	Enter	Enter	Enter
29	►	Move/Adjust Right	Right			Right	Right	Right	Right
30	Digital/Exit	Digital Input Select	Open/Close			Exit	Exit	Exit	Exit
31	▼	Move/Adjust Down	Down			Down	Down	Down	Down
32	Delay/Prev. Ch.	Delay Adjust	Return	Open/Close			Prev Channel	Prev Channel	Prev Channel
33	1	1	1	1		1	1	1	1
34	2	2	2	2		2	2	2	2
35	3	3	3	3		3	3	3	3
36	4	4	4	4		4	4	4	4
37	5	5	5	5		5	5	5	5
38	6	6	6	6		6	6	6	6
39	7	7	7	7		7	7	7	7
40	8	8	8	8		8	8	8	8
41	Tun-M	Tuner Mode	Chapter	Repeat					
42	9	9	9	9		9	9	9	9
43	0	0	0	0		0	0	0	0
44	Memory	Memory	Audio	Time					

No.	Button Name	AVR Function	DVD	CD/CD-R	Tape	VCR (VID1)	TV (VID2)	CBL (VID3)	SAT (VID3)
45	Tune Up	Tune Up	Next Chapter	Track Direct		Cancel	Sleep		
46	Direct	Direct Tuner Entry	Angle	Random Play				FAV	FAV
47	Clear	Clear	Clear	Clear		Clear	Clear	Bypass	Next
48	Preset Up	Preset Tune Up	Slow Forward	+10				Music	Alt
49	Tune Down	Tune Down	Prev Chapter	Track Increment					
50	OSD	OSD		Program		OSD	OSD	OSD	OSD
51	D. Skip		Disc Skip	Disc Skip					
52	Preset Down	Preset Tune Down	Slow Rev						
53	M1	Macro 1							
54	M2	Macro 2							
55	M3	Macro 3							
56	M4	Macro 4							
57	Dolby	Dolby Modes							
58	DTS Surr	DTS Digital Modes							
59	DTS Neo:6	DTS Neo:6 Select							
60	Logic 7	Logic 7 Select							
61	Stereo	Stereo Mode Select							
62	Skip Down		Skip –	Skip –		Scan –			
63	Skip Up		Skip +	Skip +		Scan +			
64	Rewind		R. Search	R. Search	Rewind	Rewind			
65	Play		Play	Play	Play	Play			
66	Fast Forward		F. Search	F. Search	Fast Fwd	Fast Fwd		Day +	Day +
67	Record			Record	Record	Record			
68	Stop		Stop	Stop	Stop	Stop			
69	Pause		Pause	Pause		Pause			

SETUP CODE TABLE: TV

Manufacturer/Brand	Setup Code Number
AIWA	027
A MARK	122 132
ADMIRAL	192
AKAI	123 160
AMPRO	164
ANAM	045 106 109 112 122
AOC	122 123 128
BLAUPUNKT	084
BROKSONIC	205 206
CANDLE	123 128
CAPEHART	059
CENTURION	123 171
CENTRONIC	045
CITIZEN	045 123 128 132
CLASSIC	045
CONCERTO	128
CONTEC	045
CORANDO	172
CORONADO	132
CRAIG	045 157 158 159
CROWN	045 132
CURTIS MATHES	123 128 132
CXC	045
DAEWOO	045 087 102 105 106 108 111 114 116 119 127 128 132
DAYTRON	128 132
DIGI LINK	200
DYNASTY	045
DYNATECH	063
ELECTROHOME	115 132
EMERSON	045 123 128 132 139 157 158 159 162 205
FUNAI	045
FUTURETECH	045
GE	029 087 121 123 128 133 145 159 163
GOLD STAR/LG	101 110 122 128 132
GRUNDIG	193
HALL MARK	128
HARMAN KARDON	201
HITACHI	123 128 132 144 147
INFINITY	148
INKEL	120
JBL	148
JC PENNEY	115 123 128 132 145
JENSEN	019
JVC	079 087 134
KAWASHO	173
KEC	045
KENWOOD	123 204
KMC	132
KTV	045 123 132 162
LLOYTRON	172 173
LODGENET	069

Manufacturer/Brand	Setup Code Number
LOGIK	069
LUXMAN	128
LXI	077 145 148
MAGNAVOX	030 123 128 132 145 148
MARANTZ	115 123 148
MATSUI	148
MEMOREX	069 128
METZ	084
MGA	115 123 128
MINERVA	084
MITSUBISHI	077 115 123 128 160 167 168
MTC	175 176
NATIONAL	148 177 179 180 181 182
NEC	115 121 123 125
NIKEI	045
ONKING	045
ONWA	045
OPTONICA	077
ORION	207 208 209 210 211
PANASONIC	087 148 169
PHILCO	045 115 123 128 132 148
PHILIPS	033 034 035 036 123 128 132 145 148
PIONEER	024 123 128
PORTLAND	128 132
PROSCAN	133
PROTON	059 122 128 132 165
QUASAR	032 087
RADIO SHACK	045 128 132 180 196 197
RCA	021 115 123 128 133 145 161 163
REALISTIC	045 167 196
RUNCO	152 153
SAA	183
SAMPO	059 123 128
SAMSUNG	020 022 124 128 132 145
SANYO	026 054
SCOTT	045 128 132
SEARS	128 132 145
SHARP	077 128 132
SIEMENS	084
SIGNATURE	069
SONY	028 031 117 130 136 194 212
SOUNDESIGN	045 128
SPECTRICON	122
SSS	045
SYLVANIA	025 123 128 145 148
SYMPHONIC	184
TANDY	077
TATUNG	063
TECHNICS	181
TECHWOOD	128

SETUP CODE TABLE: TV

Manufacturer/Brand	Setup Code Number
TEKNIKA	045 069 115 123 128 132
TELERENT	069
TERA	156
THOMSON	190 191
TMK	128
TOSHIBA	063 129 202
TOTEVISION	132
VIDEO CONCEPTS	160
VIDTECH	128
WARDS	069 128 132 148
YAMAHA	123 128
YORK	128
YUPITERU	045
ZENITH	069 090
ZONDA	122

Manufacturer/Brand	Setup Code Number
AIWA	040
AKAI	048 108 109 126
AMPRO	076
ASA	134
AUDIO DYNAMICS	018 048
BROKSONIC	110 147
CANDLE	134 135
CANON	135 140
CAPEHART	094
CITIZEN	134
CRAIG	045 116
DAEWOO	017 094 104
DAYTRON	094
DBX	018 048
DYNATECH	040
EMERSON	013 040 042 110 112
FISHER	017
FUNAI	040
GE	076 095 124
GO VIDEO	113
GOLD STAR/LG	018 107
HARMAN KARDON	018 049
HITACHI	040 048
JC PENNEY	018 045
JENSEN	048
JVC	018 048 111 132
KENWOOD	020 048
LLOYD	040
LXI	020 040
MAGIN	045
MAGNAVOX	040
MARANTZ	018
MEMOREX	017 020 040 052 053 054 076
MGA	049
MITSUBISHI	049 131
MULTITECH	040
NAD	139
NATIONAL	140
NEC	018 048
NORDMENDE	048
OPTIMUS	159
ORION	147
PANASONIC	125 150 167 172
PHILCO	040
PHILIPS	040 075
PORTLAND	094
PULSAR	076
QUASAR	001 125
RADIO SHACK	055 134 140 142 158 159
RCA	095 124 125 157 172
REALISTIC	017 020 040 045 159

SETUP CODE TABLE: VCR

Manufacturer/Brand	Setup Code Number
SALORA	020
SAMSUNG	045 051 095 105 109
SANSUI	048 116 147
SANYO	017 020
SCOTT	110 112
SEARS	017 020
SHARP	129 156
SONY	080 129
SOUNDESIGN	040
SYLVANIA	040
SYMPHONIC	040
TANDY	017 040
TASHICO	134
TATUNG	048
TEAC	040 048
TEKNIKA	040
THOMAS	040
TiVo	012
TMK	013
TOSHIBA	112 155
TOTEVISION	045
UNITECH	045
VECTOR RESEARCH	018
VIDEO CONCEPTS	018 040
VIDEOSONIC	045
WARDS	040 045 112
YAMAHA	018 040 048
ZENITH	040 050 076 083

Manufacturer/Brand	Setup Code Number
ADCOM	063 069
AIWA	072 111 118 156 170
AKAI	050 177 184
AUDIO TECHNICA	053
AUDIOACCESS	125
AUDIOFILE	211
BSR	044
CALIFORNIA AUDIO	109
CAPETRONIC	070
CARRERA	087
CARVER	136 140 141 143 144 145 185 186
CASIO	117 166
CLARINETTE	166
DENON	187 188 213
EMERSON	052 093 108
FISHER	055 095
FRABA	117
FUNAI	126
GE	164
GENEXXA	108
GOLD STAR/LG	016 087
HAITAI	099 214
HARMAN KARDON	001 002 025 054 190
HITACHI	093
INKEL	216
JC PENNEY	098 147
JENSEN	153
JVC	176 195 196
KENWOOD	030 062 078 079 148 151 176 178 181
LOTTE	108
LUXMAN	077 102
LXI	164
MAGNAVOX	039 113
MARANTZ	058 084 191 192 193
MCINTOSH	194
MCS	080 098
MITSUMI	152
MODULAIRE	166
NAD	013 074 197 198
NAKAMICHI	199 200 201
NEC	069
NIKKO	053 055
ONKYO	037 038 045 046 171 175 202 203
OPTIMUS	065 089 091 092 099 104 212
PANASONIC	075 109 119 158 183 204
PHILIPS	039 138 149 209
PIONEER	071 094 100 112 123 131 161 162 215
PROTON	210
QUASAR	109
RADIO SHACK	126 166 213
RCA	024 081 093 150

SETUP CODE TABLE: CD

Manufacturer/Brand	Setup Code Number
RCX	169
REALISTIC	058 093 095 104 105 108 164 166
SANSUI	047 081 134 157 172
SANYO	033 082 095
SCOTT	108
SHARP	058 105 114 151 159 167 180 181
SHERWOOD	003 041 058 105 133
SONY	103 115 116 118 132 139 163 205 206 207 208 212 217
SOUNDSTREAM	124
SYMPHONIC	059 110
TAEKWANG	177
TEAC	011 058 085 086 106 107 110 121 137 146 154
THETA DIGITAL	039
TOSHIBA	013 074 097 151 155 173
VECTOR RESEARCH	087
VICTOR	120 130
WARDS	095
YAMAHA	019 031 053 061 135 169
YORK	166

SETUP CODE TABLE: DVD

Manufacturer/Brand	Setup Code Number
APEX DIGITAL	061
DENON	019 051
GE	003 004
GOLD STAR/LG	005
HARMAN KARDON	001
JVC	006
LG	005 055 064 066
MAGNAVOX	056
MARANTZ	059
MITSUBISHI	023
NAD	062
ONKYO	009 048
PANASONIC	024 030 044
PHILIPS	056
PIONEER	041 065
PROCEED	060
PROSCAN	003 004
RCA	003 004
SAMSUNG	053 054
SHARP	028
SONY	043 045
THOMSON	003 004
TOSHIBA	009 058 067
YAMAHA	030 063
ZENITH	005 055 064

Manufacturer/Brand	Setup Code Number
ALPHASTAR	472
ALPHASTAR DBS	450
ALPHASTAR DSR	442
BIRDVIEW	425
CHANNEL MASTER	320 321 325 361
CHAPARRAL	315 316 451
CITOH	360
DRAKE	313 317 318 413 481
DX ANTENNA	331 352 362 379 483
ECHOSTAR	395 397 452 453 463 477 478 484 485
ELECTRO HOME	392
FUJITSU	324 329 334
GENERAL INSTRUMENT	303 311 323 365 403 454 468 474
HITACHI DBS	455
HOUSTON TRACKER	463
HUGHES	437 489
JANIEL	366
JERROLD	454 468 484
KATHREIN	410
LEGEND	453
MACOM	317 365 369 370 371
MAGNAVOX	461 473
MEMOREX	453
NEXTWAVE	423
NORSAT	373
OPTIMUS	466
PACE DSS	487
PANASONIC	366 469
PANASONIC DBS	457
PANSAT	420
PERSONAL CABLE	418
PHILIPS	375
PICO	407
PRESIDENT	381 404
PRIMESTAR	412 454 468 475
RCA	301 439 465 490
RCA DSS	458
REALISTIC	349 480
SAMSUNG	442
SATELLITE SERVICE CO	335 388
SCIENTIFIC ATLANTA	339
SONY	405
STAR CHOICE DBS	459
STARCAST	347
SUPER GUIDE	327 423
TEECOM	330 333 390 391 393 409
TOSHIBA	302 426 460 461 462 470
UNIDEN	323 332 348 349 350 351 354 355 381 383 389 403 466 479 480
ZENITH	384 385 387 394 419 488

SETUP CODE TABLE: TAPE

Manufacturer/Brand	Setup Code Number
HARMAN KARDON	001

SETUP CODE TABLE: CBL

Manufacturer/Brand	Setup Code Number
ABC	001 011
ALLEGRO	111
AMERICAST	212
ARCHER	112
BELCOR	113
CABLE STAR	033 113
CITIZEN	111
COLOUR VOICE	085 090
DIGI	114
EAGLE	186
EASTERN	066 070
ELECTRICORD	039
EMERSON	112
FOCUS	116
G.I.	001 011 017 096 097
GC ELECTRONICS	113
GEMINI	032 060
GENERAL	210
GENERAL INSTRUMENT	210
GOODMIND	112
HAMLIN	056 099 100 101 117 175 208
HITACHI	001 188
JASCO	111
JERROLD	001 002 011 017 073 096 097 162 188 210
LINDSAY	118
MACOM	191
MAGNAVOX	017 019 068
MOVIE TIME	035 039
NSC	035 190
OAK	197 220
PACE	179
PANASONIC	053 176 177 189 214
PANTHER	114
PHILIPS	013 019 020 085 090
PIONEER	001 041 119 171 209 215 216
POPULAR MECHANICS	116
PRELUDE	120
PRIMESTAR	162
RADIO SHACK	111 112 213
RCA	053 214
RECOTON	116
REGAL	056 099 100 101 208

Manufacturer/Brand	Setup Code Number
REMBRANT	032
SAMSUNG	072 186
SCIENTIFIC ATLANTA	183 203 221 222
SEAM	121
SIGNATURE	001 188
SPRUCER	053 081 177 189
STARCOM	002 011 163
STARGATE	120
TANDY	024
TELECAPATION	028
TEXSCAN	036
TFC	122
TIMELESS	123
TOCOM	170 205
UNITED CABLE	011
UNIVERSAL	033 034 039 042 113
VIDEOWAY	124 211
VIEWSTAR	019 025 086 089 190
ZENITH	065 125 211 219
ZENTEK	116

TROUBLESHOOTING GUIDE

SYMPTOM	CAUSE	SOLUTION
Unit does not function when Main Power Switch is pushed	• No AC Power	• Make certain AC power cord is plugged into a live outlet • Check to see whether outlet is switch-controlled
Display lights, but no sound or picture	• Intermittent input connections • Mute is on • Volume control is down	• Make certain that all input and speaker connections are secure • Press Mute Button 42 • Turn up volume control
Unit turns on, but front panel display does not light up	• Display brightness is turned off	• Follow the instructions in the Display Brightness section on page 32 so that the display is set to VFD FULL
No sound from any speaker; light around power switch is red	• Amplifier is in protection mode due to possible short • Amplifier is in protection mode due to internal problems	• Check speaker wire connections for shorts at receiver and speaker ends • Contact your local Harman Kardon service center
No sound from surround or center speakers	• Incorrect surround mode • Input is monaural • Incorrect configuration • Stereo or Mono program material	• Select a mode other than Stereo • There is no surround information from mono sources • Check speaker mode configuration • The surround decoder may not create center- or rear-channel information from nonencoded programs
Unit does not respond to remote commands	• Weak batteries in remote • Wrong device selected • Remote sensor is obscured	• Change remote batteries • Press the AVR selector • Make certain front panel sensor is visible to remote or connect remote sensor
Intermittent buzzing in tuner	• Local interference	• Move unit or antenna away from computers, fluorescent lights, motors or other electrical appliances
Letters flash in the channel indicator display and digital audio stops	• Digital audio feed paused	• Resume play for DVD • Check that Digital Input is selected
Fan does not appear to operate	• Additional cooling may not be required	• The fan is activated only when additional cooling is required due to high internal temperature. It is normal for the fan to be inactive at normal volume levels.

Processor Reset

In the rare case where the unit's operation or the displays seem abnormal, the cause may involve the erratic operation of the system's memory or microprocessor.

To correct this problem, first unplug the unit from the AC wall outlet and wait at least three minutes. After the pause, reconnect the AC power cord and check the unit's operation. If the system still malfunctions, a system reset may clear the problem.

To clear the AVR 230's entire system memory including tuner presets, output level settings, delay times and speaker configuration data, press and hold the Tone Mode Button 5 button for three seconds. The unit will turn on automatically.

NOTE: Resetting the processor will erase any configuration settings you have made for speakers, output levels, surround modes, digital input assignments as well as the tuner presets. After a reset the unit will be returned to the factory presets, and all settings for these items must be reentered.

If the system is still operating incorrectly, there may have been an electronic discharge or severe AC line interference that has corrupted the memory or microprocessor.

If these steps do not solve the problem, consult an authorized Harman Kardon service center.

Audio Section

Stereo Mode
Continuous Average Power (FTC)

65 Watts per channel, 20Hz–20kHz,
@ <0.07% THD, both channels driven into 8 ohms

Six-Channel Surround Modes
Power per Individual Channel

Front L&R channels:
50 Watts per channel
@ <0.07% THD, 20Hz–20kHz into 8 ohms

Center channel:
50 Watts @ <0.07% THD, 20Hz–20kHz into 8 ohms

Surround (L & R Side, Back) channels:
50 Watts per channel
@ <0.07% THD, 20Hz–20kHz into 8 ohms

Input Sensitivity/Impedance	
Linear (High-Level)	200mV/47k ohms
Signal-to-Noise Ratio (IHF-A)	100dB
Surround System Adjacent Channel Separation	
Pro Logic I/II	40dB
Dolby Digital (AC-3)	55dB
DTS	55dB
Frequency Response	
@ 1W (+0dB, –3dB)	10Hz – 130kHz
High Instantaneous Current Capability (HCC)	±35 Amps
Transient Intermodulation Distortion (TIM)	Unmeasurable
Slew Rate	40V/µsec

FM Tuner Section

Frequency Range	87.5–108.0MHz
Usable Sensitivity	IHF 1.3µV/13.2dBf
Signal-to-Noise Ratio	Mono/Stereo 70/68dB
Distortion	Mono/Stereo 0.2/0.3%
Stereo Separation	40dB @ 1kHz
Selectivity	±400kHz, 70dB
Image Rejection	80dB
IF Rejection	90dB

AM Tuner Section

Frequency Range	520–1720kHz
Signal-to-Noise Ratio	45dB
Usable Sensitivity	Loop 500µV
Distortion	1kHz, 50% Mod 0.8%
Selectivity	±10kHz, 30dB

Video Section

Television Format	NTSC
Input Level/Impedance	1Vp-p/75 ohms
Output Level/Impedance	1Vp-p/75 ohms
Video Frequency Response (Composite and S-Video)	10Hz–8MHz (–3dB)
Video Frequency Response (Component Video)	10Hz–30MHz (–3dB)

General

Power Requirement	AC 120V/60Hz	
Power Consumption	118W idle, 890W maximum (6 channels driven)	
Dimensions	(Product)	(Shipping)
Width	17.3 inches (440mm)	21.5 inches (545mm)
Height	6.6 inches (168mm)	9.9 inches (251mm)
Depth	15 inches (382mm)	17.9 inches (455mm)
	(Product)	(Shipping)
Weight	27.3 lb (12.4kg)	31.9 lb (14.5kg)

Depth measurement includes knobs, buttons and terminal connections.
Height measurement includes feet and chassis.
All features and specifications are subject to change without notice.

Harman Kardon and Power for the Digital Revolution are registered trademarks of Harman International Industries, Incorporated.

EzSet™ is a trademark of Harman International Industries, Incorporated (patent no. 5,386,478).

* Manufactured under license from Dolby Laboratories. "Dolby," "Pro Logic" and the Double-D symbol are trademarks of Dolby Laboratories.

DTS, DTS Surround, DTS-ES and DTS Neo:6 are registered trademarks of Digital Theater Systems, Inc.

VMAx is a registered trademark of Harman International Industries, Incorporated, and is an implementation of Cooper Bauck Transaural Stereo under patent license.

Logic 7 is a registered trademark of Harman International Industries, Incorporated.

Cirrus is a registered trademark of Cirrus Logic, Inc.

harman/kardon®

A Harman International Company
250 Crossways Park Drive, Woodbury, New York 11797
www.harmankardon.com
© 2003 Harman International Industries, Incorporated
Part No. CQX1A850Z 2/04